AUTOMOTIVE INDUSTRIES

AUTOMOTIVE and AVIATION MANUFACTURING

CIVILIAN AND DEFENSE

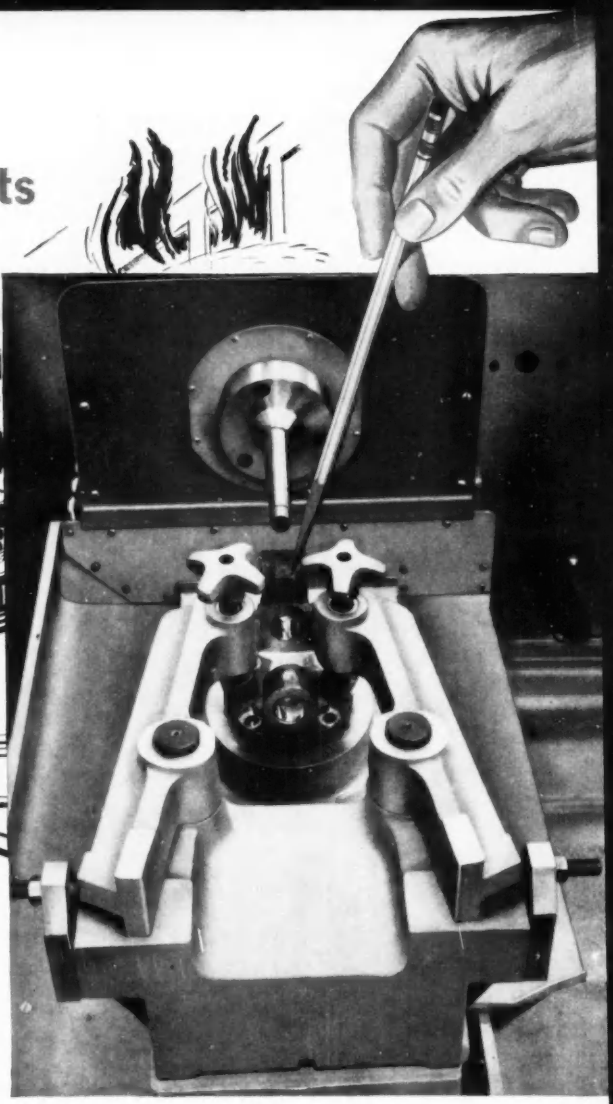
In This Issue . . . Load Carrying Capacity of Bearings • • • Testing the Autronic Eye • • • Engine-Torque Converter Oil System • • • Band Sawing Rubber • • • Special Body Welding Equipment • • • Austrian V Diesels

Complete Table of Contents, Page 3

AUGUST 15, 1952

A CHILTON PUBLICATION

Here's How Heald precision finished parts help fight a fire



Heald Bore-Matic speeds precision production of steering knuckles for fire trucks

● Whether it's a major disaster or a grass fire in Farmer Brown's pasture, fire-fighting equipment must be ready to roll anywhere on a moment's notice. Here extra dependability and precision manufacture are vital. And that's where Heald fits into the picture.

The installation shown above, for example, is used to precision borize steering knuckle assemblies for fire trucks. This Heald Model 221 Bore-Matic is arranged to permit a choice of two borizing methods — either by boring both bushing holes simultaneously with a double-tooled quill; or by boring the front hole first, with a jump cam for rapid traverse between holes. The work is clamped and located in an easy-loading platen type fixture which accommodates several different sizes of assemblies. The result — a high precision, high production operation that helps assure a continued flow of essential equipment.

Remember — when it comes to precision finishing, it pays to come to Heald.

HEALD

Heald machines speed the nation's production

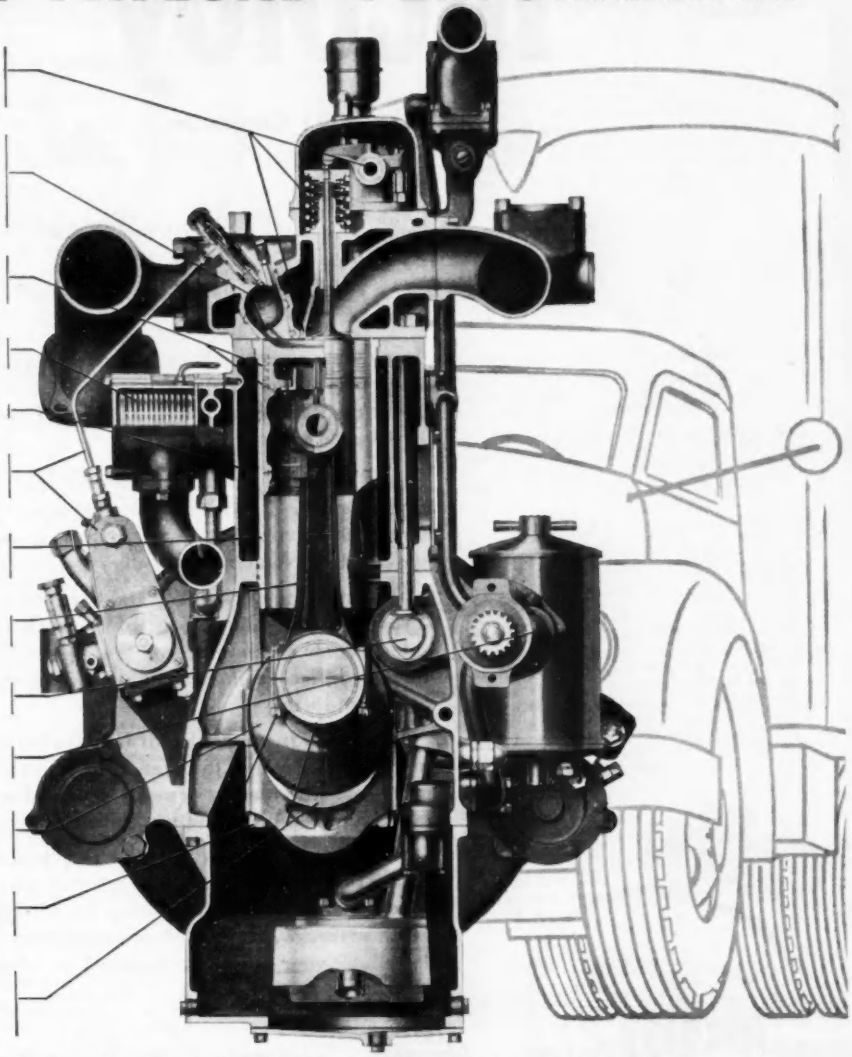
THE HEALD MACHINE COMPANY

WORCESTER 6, MASSACHUSETTS

Branch Offices: Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York

WAUKESHA DIESELS

feature-packed truckers' engines for PEAK PAYLOAD PERFORMANCE


Dual springs, long guides. Pressure-oiled rockers. Stellite-faced valves, seats.
Clean-burning combustion chamber removes from outside. Upper half water cooled; lower half air insulated to concentrate heat at throat.
Four non-stick "keystone" rings, top ring chrome-plated. Two flat oil rings.
Built-in oil cooler increases oil and engine life.
Full length water jackets.
American Bosch injection pump and single-hole pintle nozzles.
Hardened renewable cylinder sleeves test 350-400 Brinell.
Rifle-drilled rods. Oil jets cool pistons.
Hardened camshaft, single forging.
High-capacity outside oil pump.
Drop-forged hardened crankshaft. High-speed counterweights not shown.
Alloy-steel heat-treated rod and main bearing bolts.
Hardened main and rod journals. Steel-back, triple-element precision bearings, pressure oiled.

Waukesha High Duty Diesel, Model 148-DK—six cylinders, 5¼-in. bore x 6-in. stroke, 779 cu. in. displacement, peak hp 200. For full details, send for Bulletin 1532. 178

WAUKESHA MOTOR COMPANY, WAUKESHA, WIS. • NEW YORK • TULSA • LOS ANGELES

FOR A DEPENDABLE HIGH-TEMPERATURE ALLOY

Look to Incoloy

(32 Nickel — 21 Chromium)

Incoloy is comparable to Inconel® in resistance to oxidation. It is strong at elevated temperatures and because of its lower nickel content, it is *superior* to Inconel in resistance to sulfur attack.

It is the latest development of the Inco High-Temperature Engineers. And it is a suitable alloy for use in high-temperature corrosive conditions such as are found in the exhaust systems of heavy-duty gasoline powered trucks.

It offers good workability and has good welding properties. Incoloy is not embrittled by prolonged heating at intermediate temperatures. It is supplied in the usual mill forms—billets, rounds, flats, hexagons, sheet and strip, tubing and wire.

Of course, Incoloy, like all Inco Nickel alloys, is on extended delivery due to defense orders. Therefore, it will pay you to anticipate your needs well in advance. Give NPA rating and complete end-use information when ordering.

And remember, you can always count on Inco High-Temperature Engineers to help you solve your metal selection problems—write today for a copy of the High-Temperature Work Sheet. It is a simplified form for use in describing your particular material problem.

Incoloy
...for
Heat-Resisting Applications

INCO
TRADE MARK

The International Nickel Company, Inc.
67 Wall Street, New York 5, N. Y.

AUTOMOTIVE INDUSTRIES

August 15, 1952 — Published Semi-Monthly — Vol. 107, No. 4

Contents

High Spots of This Issue	15
News of the Automotive and Aviation Industries	17
Men in the News	25
Modern Techniques to Band-Saw Rubber. *By H. J. Chamberland*	32
Large Hydraulic Presses Installed at Caterpillar Plant	33
Ford Body Parts Made in Modernized Plant. *By Joseph Geschelin*	34
Aluminum Decals Require No Fasteners	39
Flash Welding of Titanium Alloys. *By I. A. Oehler*	39
New Austrian Trucks and Buses Powered by V-Type Diesels. *By W. F. Bradley*	40
Load Carrying Capacity of Bearings. *By C. J. Vogt*	42
Single Oil System for Engine and Torque Converter	46
Hotchkiss Light Alloy Engine	48
Special Welding Equipment Used at Nash Body Plant. *By Joseph Geschelin*	50
New Device for Testing Autronic-Eye	54
News of the Machinery Industries. *By Thomas Mac New*	55
New Production and Plant Equipment	56
New Products	64
Free Information Service	65
Free Literature	65
New Products for Aircraft	68
The Business Pulse	70
Airbriefs. *By Robert McLarren*	72
Special Lathe Saves Time in Turning Jet Engine Cones	74
French Automobile Industry Needs Free Enterprise System. *By W. F. Bradley*	74
New Defense Facilities	97
Calendar of Coming Events	114
More Defense Contract Awards	124
Advertisers' Index	202

Copyright 1952 by Chilton Company (Inc.)

One of the Publications Owned by
CHILTON COMPANY (INC.)
Executive Offices
Chestnut and 56th Streets, Philadelphia 39, Pa., U. S. A.

Officers and Directors
JOS. S. HILDRETH, *President*
Vice-Presidents
EVERIT B. TERHUNE — F. M. FAHRENDORF
G. C. BUZBY — HARRY V. DUFFY
WILLIAM H. VALLAR, *Treasurer* — JOHN BLAIR MOFFETT, *Secretary*
MAURICE E. COX — GEORGE T. HOOK
L. V. ROWLANDS — TOM C. CAMPBELL
FRANK P. TIGHE
GEORGE MAIBWINKLE, *Asst. Treas.*

MEMBER:
National Business Publications, Inc.
Audit Bureau of Circulations

AUTOMOTIVE INDUSTRIES is a consolidation of The Automobile (weekly) and the Motor Review (weekly), May, 1902; Dealer and Repairman (monthly), October, 1903; the Automobile Magazine (monthly), July, 1907, and the Horseless Age (weekly), founded in 1895, May, 1918.

TOUREK
BALL JOINTS • PIPE PLUGS
AND QUALITY
SCREW MACHINE PRODUCTS

ball joints—By specifying Tourek Ball Joints — the only recognized standard — you can frequently simplify design, improve performance and lower costs. A wide range of standard types is available to meet most requirements. Ball Joints for special applications can be designed and produced to your specifications.

pipe plugs—Tourek's countersunk Pipe Plugs are accurate, high strength and economical. These advantages are yours at costs which are competitive to old style plugs.

Stock sizes, available with National Pipe or Dry-Seal threads are: ¼", ⅜", ½", ¾", and 1". Also available on special order in alloy steels, aluminum or brass in sizes up to 1½" diameter.

screw machine products—Tourek sets the pace for quality and service for your screw machine product requirements. A vast array of high speed precision equipment, including single and multiple-spindle automatics as well as complete secondary equipment, is backed by more than 30 years' production experience. You can depend on Tourek for "The Best In Quality Screw Machine Products."

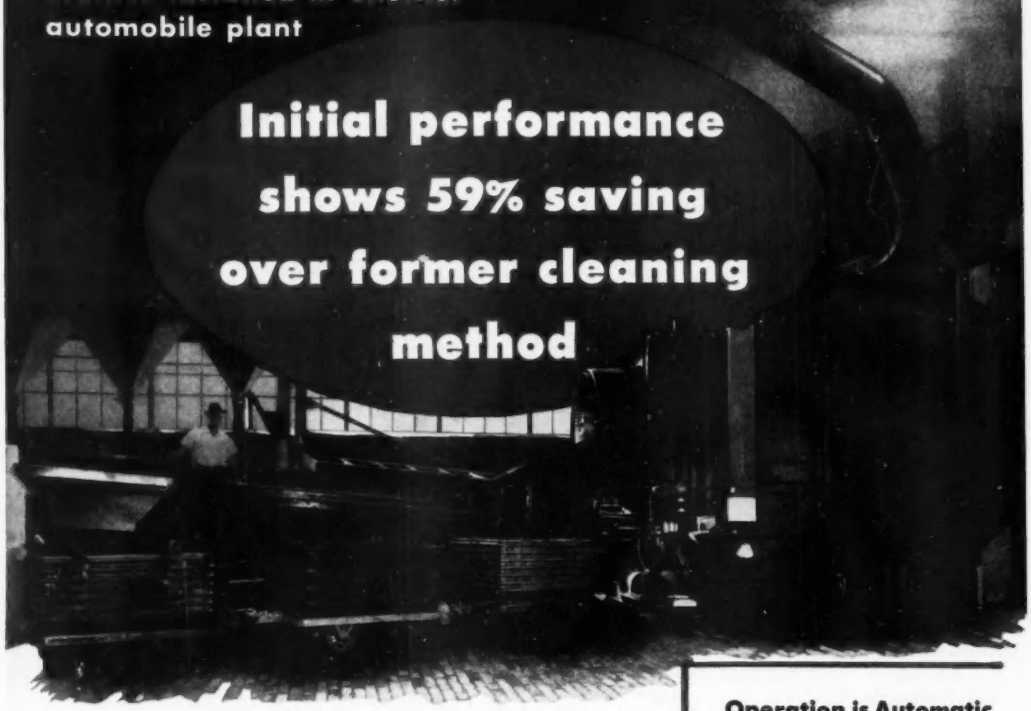
LITERATURE
● Comprehensive data on any or all Tourek products sent promptly upon request . . . write for yours now.
J. J. TOUREK MFG. CO., 1901 S. Kilbourn Ave., Chicago 23, Ill.

ESTABLISHED 1920
TOUREK
"THE BEST IN QUALITY SCREW MACHINE PRODUCTS"

AUTOMOTIVE INDUSTRIES, Vol. 107, No. 4. Published semi-monthly by Chilton Co., Chestnut & 56th Sts., Phila. 39. Entered as Second Class Matter Oct. 1, 1925, at the P.O. at Philadelphia, Pa.; Under the Act of Congress of March 3, 1879. In case of Non-Delivery Return Postage Guaranteed. Subscription price: United States, Mexico, U. S. Possessions, and all Latin-American countries, 1 year $2.00, 2 years, $3.00. Canadian and Foreign, 1 year $5.00, 2 years $8.00; single copies, 25 cents, except Stat. Issue (Mar. 15th), $1.00.

NEW Pangborn Continuous-Flo ROTOBLAST* BARREL installed in another automobile plant

Initial performance shows 59% saving over former cleaning method



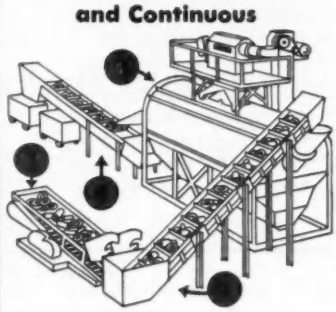
EARLY reports from one of America's foremost automobile makers show its new Pangborn *Continuous-Flo* ROTO-BLAST Barrel increases production and reduces costs. Forgings are cleaned at a *59% saving* over pickling . . . including all costs for materials, maintenance, power and labor!

Labor costs are down because manual handling is eliminated. Cleaning has been stepped up to an average rate of 12 tons per hour . . . 17 tons an hour on some forgings. And a public relations problem has been solved because pickling acid no longer pollutes nearby streams.

GET THE FACTS ON PANGBORN ROTOBLAST. Whether you pickle or clean with multiple batch equipment or tumbling mills . . . Pangborn has a ROTOBLAST Machine to clean faster, better and cheaper. Bulletin 214 gives full details. For your free copy write: Pangborn Corp., 3900 Pangborn Blvd., Hagerstown, Md.

Look to Pangborn for the latest developments in Blast Cleaning and Dust Control equipment

Operation is Automatic and Continuous



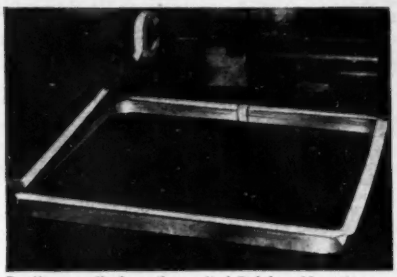
1. *Forgings are dumped from tubs onto an independent loading conveyor.*
2. *An integral flight conveyor feeds forgings to Barrel at an even rate.*
3. *Work moves continuously through Barrel while being cleaned by two ROTO-BLAST streams.*
4. *Forgings are discharged from Barrel to tubs by automatic conveyor. No manual handling is necessary.*

*TRADEMARK OF PANGBORN CORPORATION

Pangborn

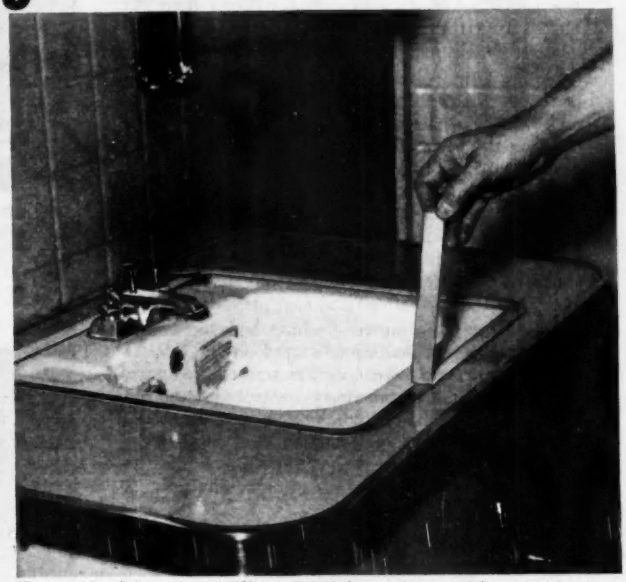
BLAST CLEANS CHEAPER with the right equipment for every job

How cloth-back tape
CUTS COSTS 20.5%
for Moulding Maker



Easily unrolled, easily applied Polyken No. 149 protects aluminum wash-bowl moulding during shipment.

Even the paper in this shipping bag would mar the shiny surfaces of this moulding if they were not covered with conformable, cloth-backed Polyken tape.



No scratches! Once the moulding is installed around the wash bowl, Polyken Tape No. 149 comes off in a continuous strip, leaving no mass residue or tiny bits of tape.

Guards shiny surfaces during fabrication and shipping, pulls off quick and clean after installation.

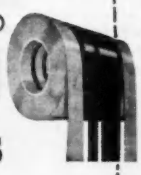
To keep polished surfaces of metal mouldings from being scratched during bending, fabrication and shipping, paper masking tape is often used. Recently Walter E. Selck & Co., Inc., Chicago, switched to the new cloth-backed Polyken Tape No. 149—and cut tape costs by 20.5%. Polyken No. 149 is the cloth tape that costs less to use than paper tape!

At the same time, they found that Polyken No. 149 conforms far more closely to curved surfaces, pulls off continuously, quickly and easily after the mouldings are installed, and leaves no gummy residue.

Polyken No. 149 is just one of a complete line of pressure sensitive tapes tailored to your job by Polyken tape specialists. Find out how they can work for you. Send for free samples and booklet today.

TAILORED TO YOUR JOB

Polyken®



INDUSTRIAL TAPES

Department of Bauer & Black
Division of The Kendall Company

Polyken, Dept AIH
222 West Adams St., Chicago 6, Ill.

For specifications, samples, and further information on No. 149 and other Polyken Tapes, please send me your *FREE BOOKLET*, "Tape is a Tool."

Name_____ **Title**_____

Company_____

Street Address_____

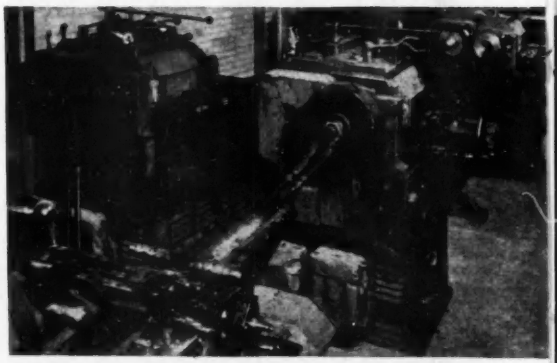
City_____ **Zone**____ **State**_____

DEFENSE PLANT DE-MOTHBALLED FAST WITH THE HELP OF TWO SUN PRODUCTS

Recently the U. S. Hoffman Machinery Corporation was asked to reopen a World War II Navy-owned shell-making plant and start production in three months. The machinery, idle for 5 years, had been protected by an external layer of rust preventive. Headstocks, gear units and hydraulic lines were among the parts coated, and unfortunately some of the protective material had seeped into them. It looked as if the machinery might have to be torn down to be cleaned.

Hoffman invited Sun and several other oil companies to survey the machinery and suggest cleaning methods. The company chose Sun's recommendations on the basis of their soundness, as well as on Sun's record for reliable service in other Hoffman plants. The Sun products used eliminated the need for any dismantling. Sun Spirits did the external cleaning job. Sunvis H.D. 700 Oils freed up the hydraulic systems, many of which were extremely sluggish; the detergency of these oils flushed away every last trace of sludge and rust preventive.

Throughout the entire cleaning and recharging process, Sun representatives stayed on the job. As part of Sun's regular service, they trained the oilers, helped work out an inventory control system, and set up lubrication schedules. The terms of the Navy contract were met, and vital defense production was started on schedule. In the year and a half that has since elapsed, there have been no machine failures traceable to poor lubrication.



BEFORE: The machinery in this Navy-owned shell-making plant stood idle—coated with a rust preventive—for 5 years after World War II. When asked to reactivate the plant in three months, the U. S. Hoffman Machinery Corporation anticipated a complete machinery teardown for cleaning, because the rust preventive had seeped into the working parts.

AFTER: No teardown was needed. Sun Spirits did the external cleaning job and the detergency of Sunvis H.D. 700 Oils the internal job—cleaning out parts and freeing hydraulic systems. Thanks to the effectiveness of these products, the job was completed and the plant put in operating condition within the three months specified by the Navy.

SUN OIL COMPANY, Dept. AA-8
Philadelphia 3, Pa.

☐ I would like to consult with a Sun representative.

☐ Please send me a copy of "Sunvis H.D. 700 Oils."

Name_____

Title_____

Company_____

Address_____

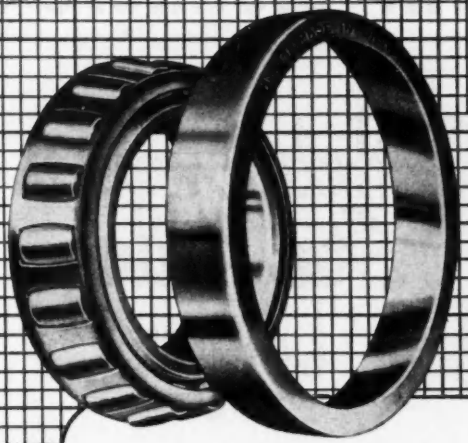
City_____ Zone_____ State_____

TECHNICAL ASSISTANCE AVAILABLE. Sun's engineers are at your service for consultation on any matters concerning hydraulics, lubrication or metalworking. It will pay you to utilize the broad experience they have gained in solving a wide variety of lubricating and processing problems in many different industries.

SUN INDUSTRIAL PRODUCTS

SUN OIL COMPANY, PHILADELPHIA 3, PA. • SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

SUNOCO®



HYATT
SPHERANGULAR TYPE
ROLLER BEARING

"Performance Proved"
HYATTS

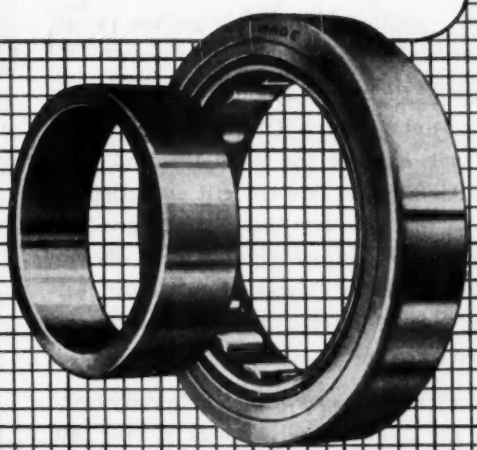
Automotive engineers "design in" Hyatt Roller Bearings on the basis of their year-in, year-out performance on model after model.

Behind the consistently outstanding performance of these dependable bearings are two completely modern plants, up-to-date high volume production equipment, excellent engineering, metallurgical research and inspection facilities—along with broad application experience.

Add to this the painstaking attention to all manufacturing details that characterize Hyatt craftsmanship... uniformity of roller diameters, lengths and end squareness... flange squareness on races ... and high surface finishes which guarantee longer lasting, quieter operating bearings.

★ ★ ★

Hyatt Quiet Roller Bearings have long been the choice of the leaders in the automotive industry. Their dependability is "built-in" and their quality proved by performance. Hyatt Bearings Division, General Motors Corporation, Harrison, N. J., and Detroit, Mich.



HYATT
STRAIGHT CYLINDRICAL
ROLLER BEARING

HYATT ROLLER BEARINGS

United Oil Bath Air Cleaners

Help Engines Stay Young Longer

CLEANING action of United Oil Bath Air Cleaners removes the grinding dust and other harmful abrasives from air entering the carburetor — lengthens life of rings, pistons, sleeves and bearings — keeps engines young longer.

After an engine has operated for 1,000 miles or a comparable number of hours for a stationary power unit, examine the oil in the bowl of a United Air Cleaner. Feel the grit and grime in the oil — that's the dirt that would be grinding against cylinder walls were it not for the efficient United Oil Bath Air Cleaner — the cleaner that removes over 99 percent of abrasives from engine air.

Protectors of millions of engines in every task, United Air Cleaners are available in over 260 models — a size and type for every kind of internal combustion engine. We welcome the opportunity to discuss our air cleaner designs with you.

NEW KOHLER K90 ENGINE

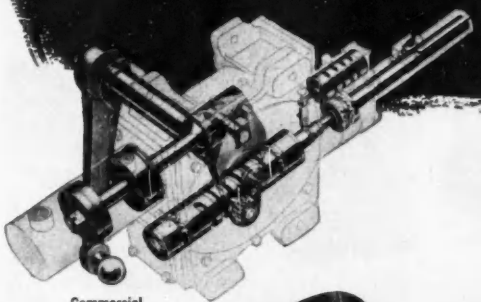
For stationary or portable engines — large units or small — there's a United cleaner to fill the bill. Here is the popular Kohler air-cooled engine. It is protected by the United Oil Bath Air Cleaner illustrated.

UNITED SPECIALTIES COMPANY

United Air Cleaner Division — Chicago 28
Mitchell Division — Philadelphia 36
Birmingham 11, Alabama

AIR CLEANERS • METAL STAMPINGS • ROLLED SHAPES
IGNITION AND TURN SIGNAL SWITCHES • DOVETAILS

Ross HYDRAULIC POWER STEERING . . . SINCE 1942



Commercial
MODEL HP-70

Easier, Safer STEERING FOR COMMERCIAL VEHICLES AND PASSENGER CARS

Ross Hydrapower is *earning* power—effortless, fatigueless steering that *steps up* operator efficiency . . . *speeds* schedules.

Ross Hydrapower is *safety* insurance—instant protection against loss of control through blow-outs . . . road obstructions . . . soft or bumpy terrain.

Ross Hydrapower—under *every* driving condition gives new steering *ease* and *safety* for driver and passengers . . . new *protection* for vehicle and payload.

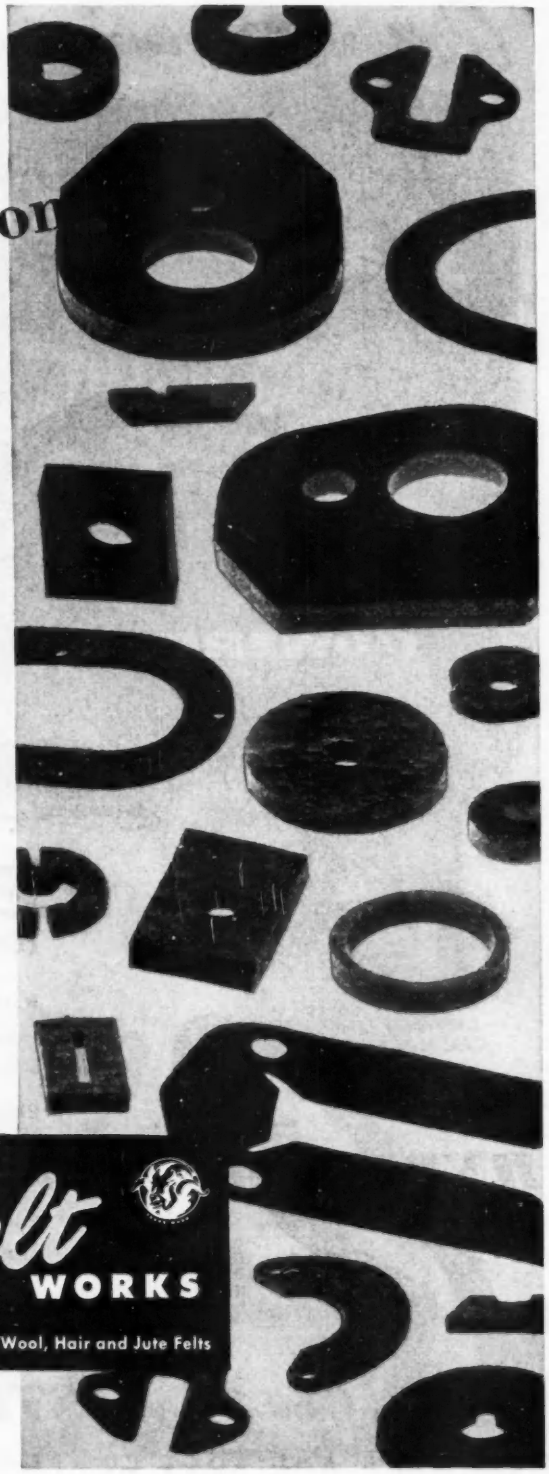
We invite discussion of *any* steering problem.

HYDRAPOWER Ross

Cam & Lever STEERING

ROSS GEAR AND TOOL COMPANY • LAFAYETTE, INDIANA

for top precision



Production to close tolerances mostly applies to metal working. But the technique of Western Felt production and processing has built an enviable reputation for engineering precision.

Chemical specifications must be perfectly met — parts from wool softness to rock hardness are cut to close tolerances. As an extremely versatile material Western Felts are resilient, flexible, compressible. They resist oil, water, heat age — do not ravel, fray or lose shape. New uses found daily. It pays to depend on Western Felt.

Check Possible Uses for Your Product

- Excluding dirt, grit, dust
- Retaining lubricants
- Thermostatic insulation
- Isolating vibration
- Cushioning shock
- Padding, packing, seals
- Air and liquid filters
- Gaskets, channels, etc.
- Grinding, polishing, etc.
- Weight reduction
- Instrument mounts

WESTERN Felt WORKS

4035-4117 Ogden Ave., Chicago 23, Illinois

Branch Offices in Principal Cities

Largest Independent Manufacturers and Cutters of Wool, Hair and Jute Felts

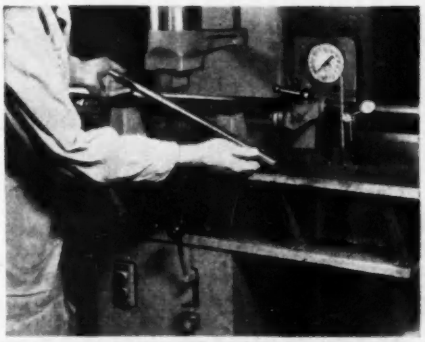
Acadia Synthetic Products Division, WESTERN FELT WORKS, Processors of Synthetic Rubbers — Sheets, Extrusions, Molded Parts.

WITH HANNIFIN-PRESSES

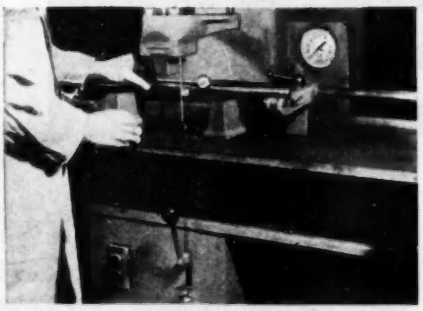
YOU STRAIGHTEN BY EYE!

HERE'S HOW AND WHY:

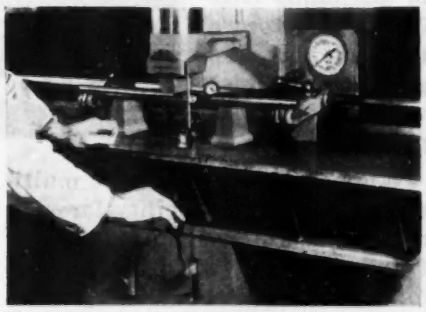
See how easy and quick straightening operations are with Hannifin Hydraulic Straightening Presses. The answer is Hannifin's exclusive, Sensitive Pressure Control . . . so sensitive that a touch of the finger causes the press to respond. With it an operator quickly becomes skilled at "straightening by eye." Ability to stop . . . re-start . . . or retract assures safety. Capacities to 150 tons. Investigate how to speed work . . . improve uniformity with Hannifin Straightening Presses. Hannifin Corporation, 1143 S. Kilbourn Ave., Chicago 24, Ill.



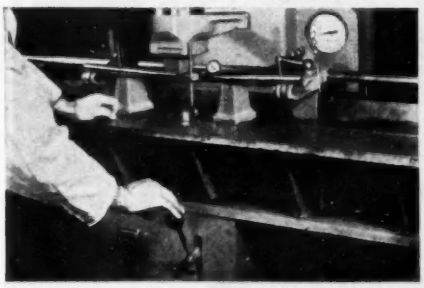
1. Rod to be straightened is placed in fixture on Hannifin 25-ton Straightening Press.* Centering fixture available.



2. Operator rotates rod against deflection indicator. Dial reads .008 at point of maximum deflection.

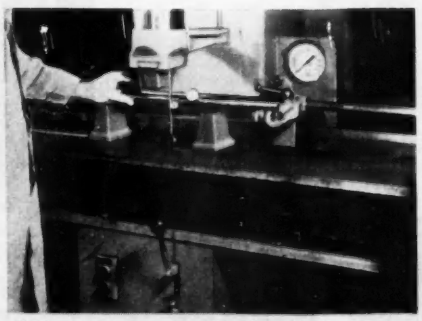


3. Operator moves Sensitive Pressure Control slightly, ram moves down just enough to overcome springs of roller fixture and bring rod down on table blocks. (Note pressure gauge has barely moved off zero.)



4. Now operator "straightens by eye." Light finger touch bends rod just beyond yield point so it will take permanent "set" in desired direction. (Gauge shows press exerting force of 6 tons—but operator watches rod—not gauge.)

*While a much smaller press could be used for this particular job, notice how the extra sensitivity of Hannifin controls makes it possible to do a wide range of straightening work on a single press.



5. Sensitive Pressure Control is released and rod again rotated against indicator . . . deflection is .001, well within limits. Next piece!

NOTE: For simplicity, we have assumed that the operator got exactly the correction he needed on one try. While this often happens, the usual sequence is bend and try, bend and try. As you can see, however, successive bends can be made very quickly.

Hannifin Representatives Are at Your Service in These Leading Industrial Centers

Atlanta, Chicago, Cincinnati, Cleveland, Dallas, Dayton, Denver, Detroit, Houston, Los Angeles, Milwaukee, Minneapolis, Moline, New Orleans, New York, Philadelphia, Pittsburgh, Richmond, Va.; Rochester, N. Y.; St. Louis, Seattle, South Bend, Ind.; Washington, D. C.; Worcester, Mass. In Canada, F. F. Barber Machinery Co., Toronto, Montreal, Windsor, Hamilton, Vancouver.

HANNIFIN

Hydraulic Presses • Pneumatic Presses • Hydraulic Riveters
Hydraulic Cylinders • Air Cylinders • Air Control Valves

WRITE FOR BULLETIN 130

Hannifin Corporation, 1143 S. Kilbourn Ave., Chicago 24, Illinois
Please send me Bulletin 130 on Hannifin Hydraulic Presses. I understand it includes information on Hannifin Straightening Presses.

Name.....

Position.....

Company.....

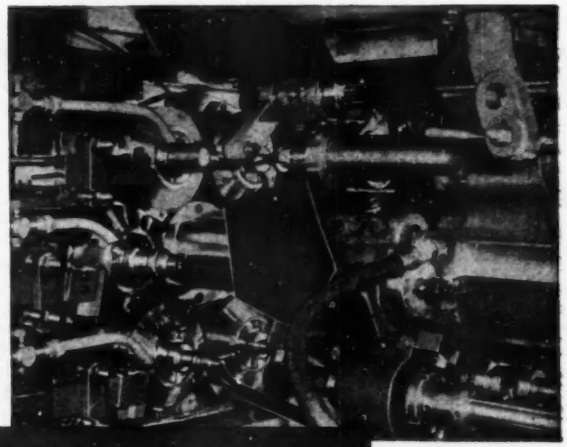
Address.....

City.....*State*.....

Case histories have appeal, whether they're about someone's time being bettered at a lathe or at an altar. Success likes success, and "misery likes company."

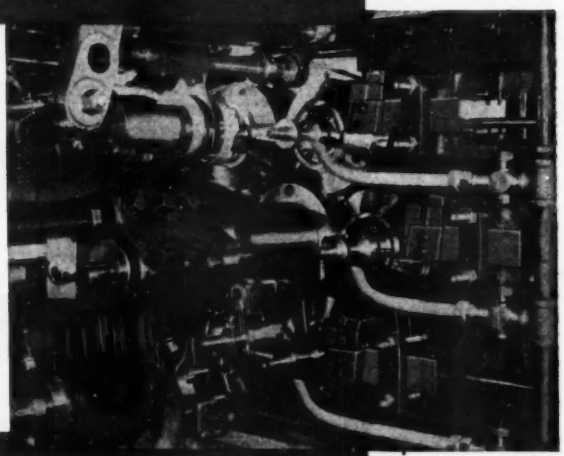
An "automatic's" case history is just an *end* of a *means* of machining facility. If you procure the right facilities, good case histories will result in *your* plant.

When selecting the best multi-spindle automatic facility for *your* needs, you will want to compare *all brands*. But you should have *full* information for a thorough comparison. You can have it on CONOMATICS.

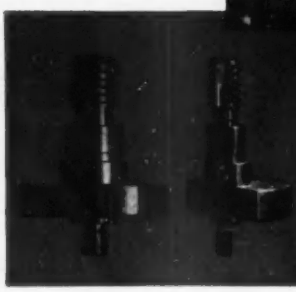


Front Side of Tooling Area 1-5/8-SIX

THE FACILITY BEHIND THE NEWS

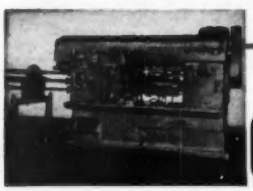


Rear Side of Tooling Area 1-5/8-SIX



Cross drilling, cross milling, end broaching, end milling, and sawing operations are commonly performed by stopping the work spindles – often a costly procedure. For certain requirements, such as for the broached hole in the piece shown, CONOMATICS have performed all of the operations mentioned without stopping the work spindles.

A Comparison of ALL Automatics is in favor of Cone

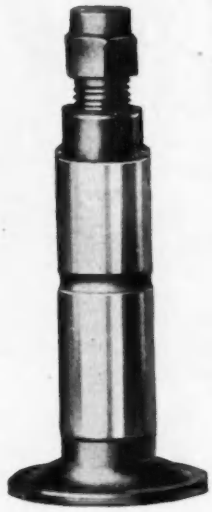


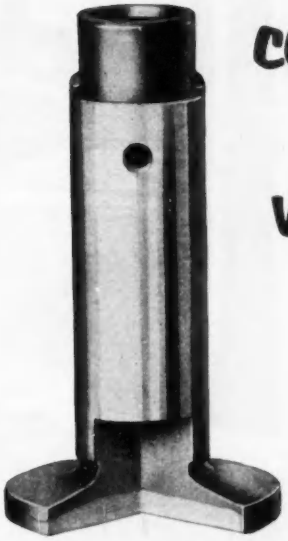
Conomatic } **CONE AUTOMATIC MACHINE COMPANY, INC. WINDSOR, VT., U.S.A.**

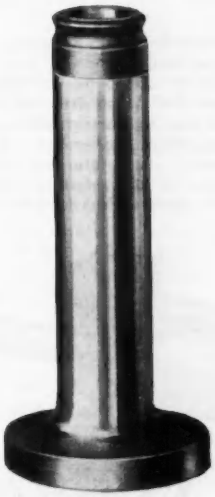
for modern high-speed engines

Eaton Tappets

combine strength, light weight, wear resistance







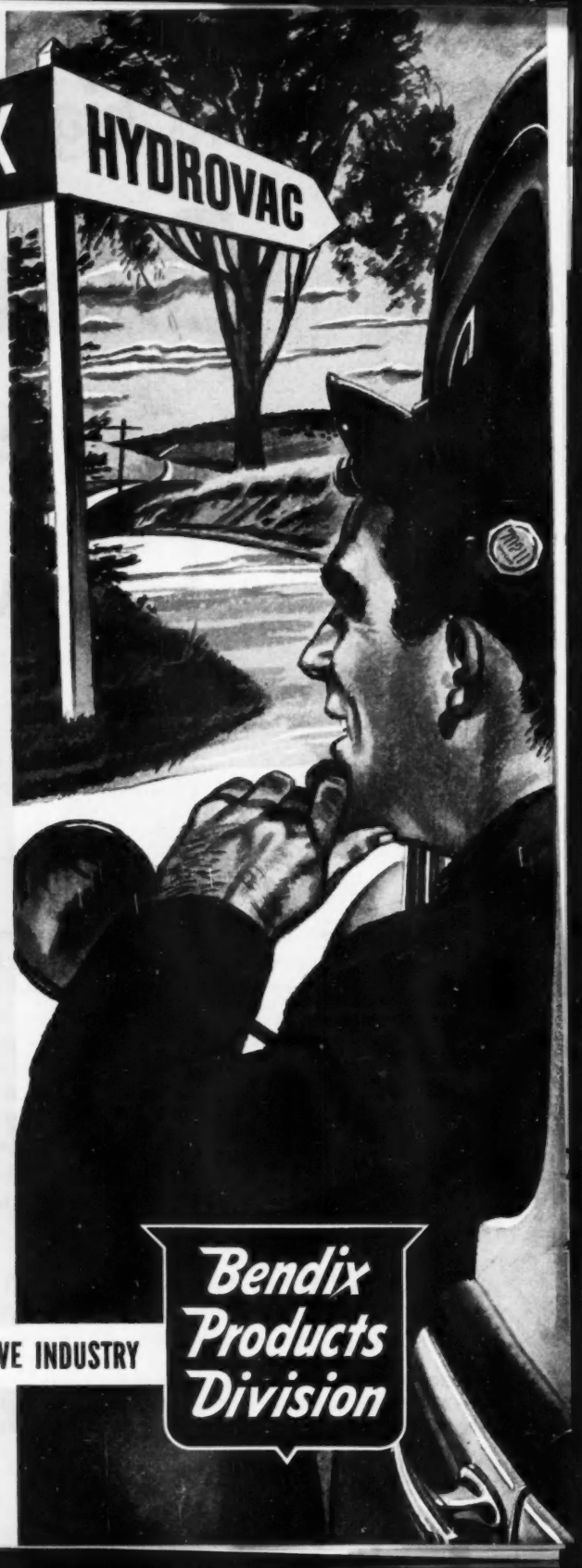
The higher tappet loads in modern engines require extremely hard tappet faces and light weight bodies to insure proper functioning of the valve train. Eaton tappets combine these important advantages. A unique puddling method, perfected by Eaton over a period of years, produces exceedingly hard white iron tappet faces on steel bodies, providing high load-carrying capacity of face combined with desired lightness of the steel body. With this combination of superior strength, light weight, and wear-resistant face, these tappets meet the exacting requirements of today's and tomorrow's engines.

EATON MANUFACTURING COMPANY

General Offices: CLEVELAND, OHIO

SAGINAW DIVISION: 9771 FRENCH ROAD • DETROIT 13, MICHIGAN

PRODUCTS: Sodium Cooled, Poppet, and Free Valves * Tappets * Hydraulic Valve Lifters * Valve Seat Inserts * Jet Engine Parts * Rotor Pumps * Motor Truck Axles * Permanent Mold Gray Iron Castings * Heater-Defroster Units * Snap Rings Springtites * Spring Washers * Cold Drawn Steel * Stampings * Leaf and Coil Springs * Dynamatic Drives, Brakes, Dynamometers



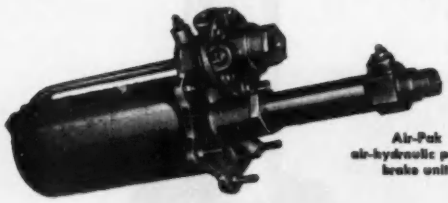
Either Way – YOU'RE ON THE ROAD TO BETTER POWER BRAKING!

There's no need to be puzzled about the question of efficient power braking for *any commercial vehicle*. Where the preference is for a hydraulic system, Hydrovac, with over two and a half million installations, has proven itself the undisputed leader in its field. And for vehicles where air actuated brakes are the choice, the new Bendix Air-Pak air-hydraulic power braking unit is foremost in its field.

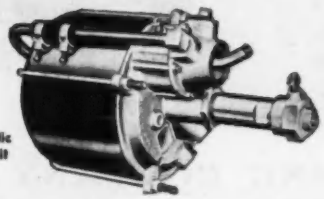
Air-Pak, similar in design and principle to the Hydrovac, changes air pressure into hydraulic pressure by means of two direct connected pistons, thus combining all the well proven advantages of hydraulic brake action with an air brake system.

Products of twenty-five years of practical braking experience, these outstanding power braking systems offer faster, more positive and better controlled braking. And in both the vacuum and the air actuated units, brakes can be applied instantly by foot power alone—a safety factor of tremendous importance. Remember, regardless of size of vehicle or whether your preference is for vacuum or air actuated brakes, for the industry's finest power braking systems—specify Bendix* Hydrovac* or Bendix Air-Pak.

*REG. U.S. PAT. OFF.



Air-Pak air-hydraulic power brake unit



Hydrovac vacuum-hydraulic power brake unit

BRAKING HEADQUARTERS for the AUTOMOTIVE INDUSTRY

BENDIX · PRODUCTS DIVISION · **SOUTH BEND**

Export Sales: Bendix International Division, 72 Fifth Ave., New York 11, N.Y. • Canadian Sales: Bendix-Eclipse of Canada, Ltd., Windsor, Ontario, Canada

AVIATION CORPORATION

Bendix Products Division

AUTOMOTIVE INDUSTRIES

EDITORIAL STAFF

James R. Custer, Editor
Joseph Geschelin, Detroit Editor
H. H. Roberts, Engineering Editor
Marcus Ainsworth, Statistician
Paul C. Kennedy, News Editor
Andrew W. Shearer, Ass't Editor
Robert P. Homer, Ass't Editor
Thomas MacNew, Ass't Editor
Leonard Westrate, News Editor, Detroit
R. Raymond Kay, Pacific Coast Ed.
Howard Kohlbrenner, Art Director
W. F. Bradley, European Correspondent

WASHINGTON BUREAU

George H. Baker, Washington Editor
Karl Rannells, Washington News Ed.
Ray M. Stroupe, Washington News Ed.

•

Paul Wooton, Washington Member, Editorial Board

•

BUSINESS DEPARTMENT

G. C. Buzby, President and Manager Automotive Division
E. H. Miller, Advertising Mgr.
E. W. Hevner, Circulation Mgr.
John Pfeffer, Promotion Mgr.
Charles W. Hevner, Research Mgr.

REGIONAL MANAGERS

CHICAGO—John T. Hoole
916 London Guarantee and Accident Building
Chicago 1, Ill.

DETROIT—E. E. Elder
1015 Stephenson Bldg.
Detroit 2, Mich.

PHILADELPHIA and NEW YORK—
Nelson W. Sieber
Chestnut and 56th Sts.
Philadelphia 39, Pa.
and
100 East 42nd St.
New York 17, N. Y.

CLEVELAND—Jack C. Hildreth
1030 National City Bank Bldg.
Cleveland 14, Ohio

SAN FRANCISCO—R. J. Birch
300 Montgomery St.
San Francisco 4, Calif.

LOS ANGELES—L. H. Jackson
3156 Willshire Blvd.
Los Angeles 5, Calif.

•

Editorial and Business Executive Offices
Chestnut and 56th Sts., Philadelphia 39, Pa.
Cable Address Autoland, Philadelphia

High Spots of This Issue

Modern Techniques to Band-Saw Rubber

The formerly knotty problem of sawing rubber with ease and accuracy has been unraveled with new types of saw blades and rapid machines.. Recommendations for performing typical rubber cutting tasks in automotive fields are given. Page 32.

Ford Body Parts Made in Modernized Plant

Its stamping plant in Dearborn, Mich., is a notable example of the increasing emphasis being placed by Ford Motor Co. on all forms of Automation. Ways in which the entire production setup has been streamlined are described here. See Page 34.

Diesel-Powered Austrian Trucks and Buses

The firm of Graf & Stift has put Austria back in the truck and bus field with a new line of vehicles. Contained in this article are complete specifications and sectional drawings of the four and six-cyl Diesels which power them. Page 40.

Load Carrying Capacity of Bearings

One key factor in determining the load carrying capacity of journal bearings is the influence of length-diameter ratio. The author includes in his mathematical analysis of this element numerous charts and diagrams. See Page 42.

Special Welding Equipment Used at Nash Body Plant

Rearrangement of welding lines and ordering of new equipment were two steps taken by Nash at its Milwaukee, Wis., body plant for production of 1952 cars. Particulars of the new setup and its operating features are fully explained. Page 50.

21 New Product Items And Other High Spots, Such As:

Large hydraulic press installed at Caterpillar plant; aluminum decals require no fasteners; flash welding of titanium alloys; single oil system for engine and torque converter; Hotchkiss light alloy engine; new device for testing Autronic-Eye; special lathe saves time in turning jet engine cones; and French automobile industry needs free enterprise system.

Automotive and Aviation News, Page 17
Complete Table of Contents, Page 3

AUTOMOTIVE INDUSTRIES COVERS
PASSENGER CARS • TRUCKS • BUSES • AIRCRAFT • TRACTORS • ENGINES • BODIES • TRAILERS • ROAD MACHINERY • FARM MACHINERY • PARTS AND COMPONENTS • ACCESSORIES • PRODUCTION EQUIPMENT • SERVICE EQUIPMENT • MAINTENANCE EQUIPMENT
ENGINEERING • PRODUCTION • MANAGEMENT

FOR 110 YEARS...

1842

QUICK SHIPMENT OF

1922

STEEL FROM STOCK

1952

Here, at a glance, is a quick review of more than a century's progress in the delivery of Ryerson steel.

The original Dobbins made their plodding rounds from a single small iron store. Today, their mechanized successors speed delivery from a network of fifteen huge steel-service plants.

And, while the first Ryerson wagon carried such products as saddle tree, horse shoe and boiler iron, today's giant trucks deliver an almost endless variety of carbon, alloy and stainless steels.

The Ryerson sales representative, too, has changed with the times. Today he heads up a team of specialists who are ready and able to help you on every problem relating to steel from stock.

While current demand may deplete supplies of some sizes, our over-all stocks are large and complete. And you can always count on the same friendly will to help that steel buyers have found at Ryerson for 110 years.

PRINCIPAL PRODUCTS: CARBON, ALLOY & STAINLESS STEELS... BARS, STRUCTURALS, PLATES, SHEETS, TUBING, ETC.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • CLEVELAND • DETROIT
PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

News of the AUTOMOTIVE AND AVIATION INDUSTRIES

Vol. 107, No. 4 August 15, 1952

Steel Firms Struggle to Restore Production

At press time, the steel industry was engaged in a titanic struggle to restore full-scale production which had been brought to a near standstill by the prolonged strike. The road back was a long one indeed, but output rose from a mere 15 per cent of capacity the last week in July to approximately 83 per cent the second week in August.

Defense Work First

NPA, while sympathetic to the cries for steel from all quarters, insisted that military, atomic energy, and machine tool programs have first call on supplies of the precious metal. In short, defense work was "top dog," and warehouse stocks of aircraft quality steel, previously limited largely to aircraft plants, were made available to other types of defense plants as well. Small businesses in dire straits also were to be helped first.

Iron Ore Situation

Simultaneously, every effort was being bent toward easing the threat of a serious shortage of iron ore. Ore shipments, which had been badly bogged down by a sympathy strike of ore workers for the steelworkers, were given priority over other types of Great Lakes cargoes. Plans were also being mapped to lengthen the usual shipping season as much as possible. Large rail shipments were scheduled.

Challenge Faced

In spite of the many problems involved in restoring full production, the steel industry appeared confident in its ability to solve them and gratified by the price relief granted by OPS under terms of the strike settlement. An exception, however, was the tool steel group, which had received little encouragement from OPS on its request for a 5.3 per cent price boost, instead of the 4.7 per cent increase proposed by the agency.

United Press

BABY BOMBER

This is an in-flight view of one of the controversial "baby bombers" that are designed to hit enemy ground installations. The Fletcher Aviation Corp. model FD-25 is only 30 ft long, has a 250-hp engine and weighs 2500 lb fully loaded. The company calls this one a "Flying Tank Buster".

New Synthetic Rubber Eliminates Cold Process

A new synthetic rubber that eliminates need for the costly refrigeration equipment now used to produce "cold" rubber for tire treads was announced recently by the Firestone Tire & Rubber Co.

The new rubber is said to possess all of the long-wearing attributes of cold rubber and can be produced with the same equipment standardized in all synthetic rubber plants during World War II for output of GR-S rubber.

Several years ago, motorists were introduced to cold rubber, which was polymerized at 41 F instead of at the 122 degree temperature used previously by all Government-owned plants. The new rubber is produced at the standard 122 degree polymerizing temperature.

Early in the synthetic rubber development program, a large number of catalysts, or initiators, for the polymerization process were examined by Government and industry chemists. A recent review of some of these materials by Firestone led to the discovery that the material known as Nitrazole CF would produce a superior synthetic rubber by the conventional "hot" rubber process.

Car Makers May Adopt Tubelesss Tire Next Year

According to a report from the tire industry, there is a good possibility that at least one automobile manufacturer may adopt tubeless tires as standard equipment on 1953 models. At least three of the largest tire builders have such tubeless tires on test with passenger car builders, and if they prove satisfactory it may be possible that within two or three years they may become standard equipment.

News of the AUTOMOTIVE

No More Crosley Production Unless New Firm Comes In

General Tire and Rubber Co. has confirmed the report that it does not intend to resume production of Crosley vehicles either now or later. The new owner plans to use the Crosley plants, acquired in a recent stock exchange, exclusively for its own industrial production.

General Tire also states that it has received a number of inquiries indicating an interest in taking over Crosley car manufacturing. Consequently, there is some possibility that another company may come into the picture to produce the light car, depending on negotiations with General Tire.

NPA to Reconsider Car, Truck Quotas

Although Ford Motor Co. lost its appeal to NPA for a greater share of the industry's production quota, NPA is taking another look at individual company allocations and is expected to make some adjustments for the fourth quarter. It will hold out about five per cent of total production, to be distributed after new determinations are made.

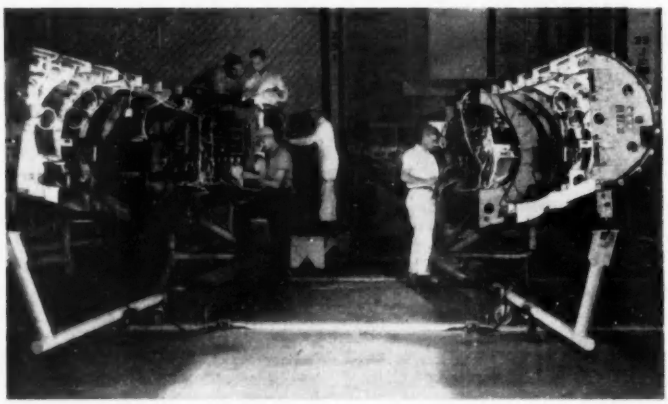
The agency will look at the competitive position of each company during the year ended last June 30, and has invited automobile and truck manufacturers to present supporting data for any appeals for higher quotas. It also will ask those companies which did not make their full allocations during the first and second quarters to explain why they fell short.

Ford Gets Development Job for New Vehicle

Ford Motor Co. has been given a contract to design, construct, and test a new quarter-ton 4-wheel drive military vehicle. The $2.5 million contract calls for building and testing five prototype vehicles.

Under an earlier contract, Ford was awarded a development program and was to come up with a design for a completely new vehicle. With new engine, chassis, frame and body, the vehicle is said to be lighter, sturdier, and to have better performance than any similar vehicle now produced.

The new contract calls for delivery of a prototype of the vehicle within 24 months. The experimental vehicles, which will bear the designation M-151, will be built in the Detroit area.



SCORPIONS DIVIDE TO MULTIPLY

One secret of the expanding production of the F-89 Scorpion all-weather intercepter is the "on the half shell" production line at the Northrop Aircraft Co. plant. Assemblers install plumbing, wiring, and other equipment while working on two fuselage sections. Halves are joined at the end of the production line.

Output Will be Spotty Into Fourth Quarter

The automotive industry is gathering momentum after being all but completely paralyzed by the longest steel strike in history. The 53-day stoppage dealt a severe blow to vehicle production, with output cut to fewer than 20,000 vehicles a week at its lowest point. It is estimated that when total effect of the strike is calculated more than 400,000 cars and trucks will have been lost.

Plans Unsettled

Production plans of the various manufacturers were still indefinite at press time. Vendor's problems are a major factor; juggling of steel stores is expected between suppliers.

Chrysler Corp. foundry and component parts workers were beginning to be recalled the first week in August. Assembly workers were tentatively scheduled to report about Aug. 15 in the Detroit area, and within the following two weeks at Indiana and California plants.

General Motors Corp., as late as the first week in August, could not tell when all of its plants would be back in operation although some production was going on at home cities in all divisions. General Motors parts plants also are struggling to get back into production.

Ford Motor Co. was able to keep up intermittent production all through the strike, working about every other week, and expects to continue on that basis until September. The company expects hit or miss production for the next month at least. Although Ford supplies about one-half of its own steel it still may run into shortages of special types and also may have to supply some of its foundries to prevent shutdowns.

Independents Reopen

Packard Motor Car Co. also was expecting to resume assembly about the middle of this month. Nash-Kelvinator Corp., which went down July 3, will resume assembly on Aug. 18 at its Kenosha operations. Its west coast plant, which was able to operate through July, closed Aug. 4 and will

reopen Sept. 2. Willys-Overland Motors, Inc., resumed production of military Jeeps about July 28.

Hudson Motor Car Co. and Kaiser-Frazer Corp. were able to keep going throughout the strike but on reduced schedules which had been in effect due to the steel stoppage. Hudson has been running at about 40 cars an hour, and the Kaiser-Frazer schedule has been from 280 to 300 cars a day. Studebaker Corp. passenger car production is to resume Aug. 18.

In the East, the Ford plant at Buffalo was to resume production Aug. 4. The Chevrolet engine and gear and axle plants at Buffalo were to reopen between Aug. 8 and 18. In Canada, Chrysler Corp. announced it would not resume production until about three weeks after the U. S. plants are opened. Ford and General Motors employees, many of whom were scheduled for vacations, were to be notified when to return.

Willys-Overland Opens Procurement Center

Willys-Overland Motors, Inc., last week opened a new combination salesroom and government inspection center at Washington, D. C. Government procurement officials will be able to visit the new sales room at any time to inspect any of the many parts the company is equipped to manufacture. Willys is said to be the first automobile manufacturer to provide such facilities.

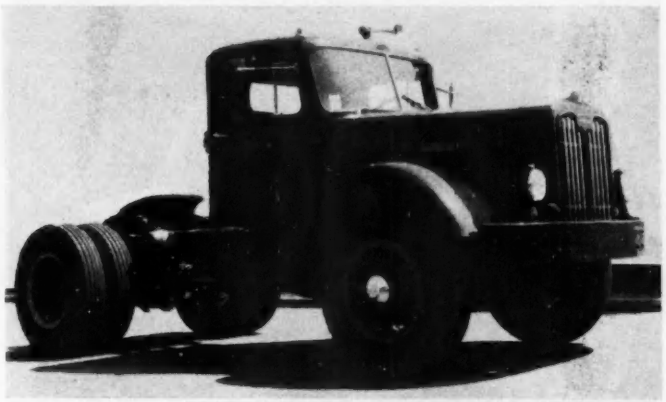
Airframe Sales Up, Profits Down

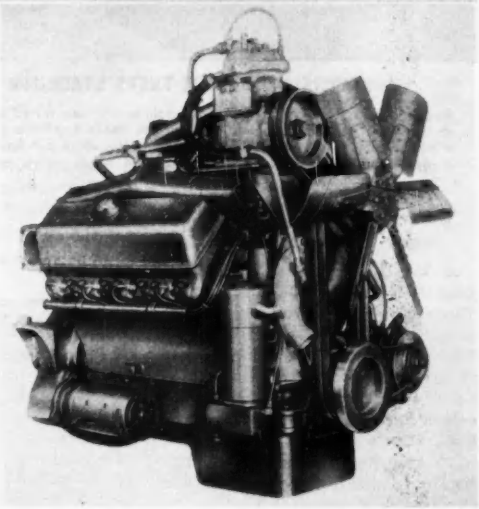
Airframe manufacturers under the nation's defense buildup have boomed their sales, but profits to the companies have slumped considerably, according to a survey recently completed by the Aircraft Industries Association.

A checkup of 12 major airframe manufacturers shows an increase in total sales of 42.6 per cent for 1951 over 1950. But net profits after taxes sank to approximately 50 per cent of the 1950 figure.

The survey reveals that the 12 companies realized an average $1.60 profit for each $100 of sales in 1951. This compares with a $6.20 profit on sales shown by a survey of 1,763 leading corporations, recently completed by the National City Bank of New York for the year 1951.

Heavy production requirements during 1951 made it necessary for the 12 companies to add $41.6 million in plant facilities—the largest increase since 1941. Expansion was financed for the most part by $15.1 million in long-term borrowing, $5.3 million in retained earnings, a $13.2 million decrease in net working capital, and $4.3 million in additional stock.





V-8 POWERED TRACTOR

Autocar Co. announces this new tractor in 142 and 159-in wheelbase lengths for light-heavy duty. The engine gives 207 hp at 3000 rpm, and weighs 1250 lb. Displacement is 540 cu in. and compression ratio is 6.7 to 1. Tractor and engine have been tested on Eastern turnpikes for nearly a year, and the combination is said to haul a payload out of proportion to its weight. Engine is made by Le Roi Co. to Autocar specifications.

Timken Increases Axle Guarantee Period

A new axle shaft free, if the original axle shaft fails within 100,000 miles or three years, is now offered owners of its axle-equipped trucks by Timken-Detroit Axle Co.

The guarantee is effective on all shafts purchased or installed after Aug. 1, 1952, and covers defective material or workmanship but not accident or abuse. Arrangements have been made to replace a defective shaft through authorized dealers.

News of the AUTOMOTIVE

PRECISION DEVICE TESTS STEERING GEARS

Steering gears for Chrysler Corp. automobiles are now tested on the production line at the New Castle, Ind., plant. The machine above applies a predetermined load to a gear to be tested, and traces on a graph the effort put into the gear to produce a given amount of work. The device is said to determine efficiency very quickly.

Canadian Jet Development Funds Raised by Britain

A. V. Roe Canada, Ltd., announced recently it has $3 million more at its disposal to develop and produce jet planes and engines for this country. The parent Hawker-Siddely Group of Britain placed the money in Avro Canada's treasury, bringing Hawker's investment in Avro Canada to $10 million.

The company is engaged in production and research of jet aircraft and the Orenda jet engine.

ASTE, Toledo U. Sponsor Four-Year Tool Course

A four-year course in tool engineering will be offered by Toledo University when its fall sessions begin on September 11 of this year. The curriculum, which was developed in cooperation with Toledo Chapter No. 9 of the American Society of Tool Engineers, is open to high school graduates.

The entire program can be completed in four years of evening session attendance, and thus can be utilized by junior tool engineers already employed who desire further basic grounding in their field of work.

International Engine Has Higher Compression

International Harvester Co. has placed in production an improved version of its Super Blue Diamond 269 engine which features six major changes. These include a new cylinder head, increased compression ratio to 6.5 to 1 from 6.3 to 1, new plated aluminum alloy pistons, new head gasket, changed ignition timing, and recalibrated carburetor.

Intake ports and cooling passages in the new cylinder head have been changed so that the area under the intake valves is of a "triangle" rather than "T" shape, forming streamlined passages into the cylinders for the fuel-air mixture. Water passages around the outside of the port areas also have been smoothed out for better cooling.

The new plated aluminum alloy pistons are now ground to a J-8 cam. A thin tin plating is added to the pistons for quicker break-in.

New Control Unit Announced for Handicapped Drivers

A new simplified unit of controls which permits handicapped persons to drive a car without the use of their feet was announced recently by Plymouth Div. of Chrysler Corp.

The new device provides a single hand lever mounted beneath the steering wheel which operates the clutch, brake, and accelerator pedals. Only three motions are involved, one to actuate each of the three pedals.

The unit operates entirely mechanically, without power cylinders, and may be installed in two hours and removed in 30 minutes. It can be locked out so that the car may be driven by others in the usual manner, without removing it from the car. Its installation does not alter the original clutch and brake linkage mechanism and no special maintenance other than normal lubrication is required, Plymouth said.

Navy Jet Laboratory to be Run by Thompson Products

The Navy has announced that it will build a jet engine testing laboratory at Painesville, O., to be operated by Thompson Products, Inc.

The company currently has sizable contracts for jet engine parts. Because of military security, the Navy did not reveal the estimated cost or the size of the new laboratory.

Canadian Automobile Ownership Surveyed

Of Canada's 1.9 million privately-owned cars, about 800,000 are over 10 years old, according to a recent survey by the Canadian Automobile Chamber of Commerce. Their average speedometer reading is 62,000 miles.

Six out of every 10 cars are bought for business purposes, and less than half the cars are bought new, the survey shows. Canadian motorists drive an average of 6200 miles a year.

Over one fourth of the car owners earn less than $2,000, yet Canadian buyers financed only 30 per cent of their car purchases. Less than half involved a trade-in.

AND AVIATION INDUSTRIES

Douglas to Build RB-66 Jet Bomber

Douglas Aircraft Co.'s Long Beach Div. will engineer and build the RB-66 jet reconnaissance bomber for the Air Force, according to a recent announcement.

The RB-66 is a twin-jet, swept-wing bomber developed for use by the Tactical Air Command. Based on the A3D, originally designed for the Navy by the Douglas El Segundo Div., the RB-66 carries a three-man crew and is rated in the 600-700 mph class.

McCulloch Declares Employee Bonus

A profits-sharing bonus of $600,000 was recently declared by McCulloch Motors Corp. for its employees. The current bonus is nearly twice as large as any preceding bonus paid by the company, and reflects increased sales, increased employment totals, and higher rates of pay for employees.

It was reported that total employee benefits, including bonuses, but not including company recreational programs, during the McCulloch fiscal year ending June 30, 1952, amounted to $1,646,300, an average benefit per employee of more than $1,000, or an average benefit per employee of more than 50¢ per hour.

F-86H Output Will Start Toward End of This Year

Production of the F-86H, latest version of the Sabrejet fighter, will begin late this year at the Columbus, O., Div. of North American Aviation, Inc., according to company officials. This new model is slightly larger than previous models and is to carry a more powerful engine than other models.

Westinghouse to Develop Atomic Power Plant

Westinghouse Electric Corp. has been assigned the task of developing an atomic power plant for the propulsion of large naval vessels such as aircraft carriers.

Work on the new reactor project will be centered at the Atomic Power Div. Bettis plant near Pittsburgh, Pa., and will be carried out with the assistance of other Westinghouse operating divisions and widespread subcontractors.

U. S. Synthetic Plant Changed to Cold Rubber

The Port Neches, Tex., GR-S synthetic rubber plant operated by Naugatuck Chemical Div., United States Rubber Co., is being converted from "hot" to "cold" synthetic rubber and its production capacity increased from 70,000 long tons to more than 100,000 long tons annually, the company announced recently.

The conversion and expansion program is expected to be completed by late fall, barring any delivery bottlenecks in equipment and materials. It will cost approximately $2.5 million.

The increase in plant capacity is made possible by new fast-acting chemical formulae for GR-S rubber and by a new type of heat exchanger. This will cut the time needed to make the "cold variety" of synthetic rubber from a normal 14 hours to eight hours.

Firestone Announces New Heavy Duty Truck Tire

A newly developed heavy-duty truck tire to meet the large popular-price market was announced recently by the Firestone Tire & Rubber Co.

The new tire is of rayon construction with a new rubber compound in the tread and a heavy bead insuring maximum stability through a better fit on the rim, according to the company.

The new truck tire is said to give longer original and retread mileage with gum-dipped, tension-dried rayon cord that eliminates tire body growth and tread cracking, and a flatter tread.

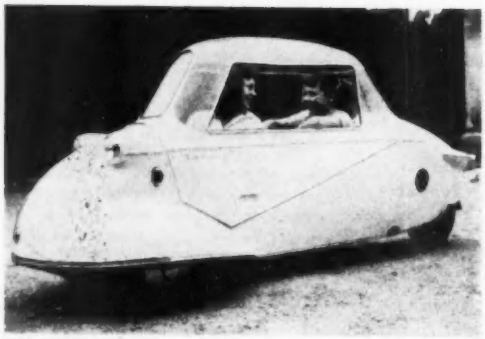
ASF, International Add War Contracts

American Steel Foundries, Chicago, Ill., and International Harvester Co. have been given additional large defense contracts. American Steel will build tank hulls and turrets under a contract totaling more than $23.7 million. International has been awarded an order totaling more than $20.5 million for trucks and parts.

NEW HEAVY-DUTY FIRE TRUCK SERIES

A new heavy-duty fire truck chassis, made by International Harvester Co., has gross vehicle weight rating of 30,000 lb, and a choice of engines developing 266 to 318 hp. Model L-306 shown has a 275 hp engine with dual ignition; wheelbase is 169 in. A 500-gal water tank and 1000 gpm pump are provided.

News of the AUTOMOTIVE



United Press

QUICK "FLITZER"

This tiny German cabin scooter can only be entered by swinging open the top. It is said to have gone over 60 mph.

First Aviation Engine at Chevrolet Division

Chevrolet Motor Div. completed the first aviation engine at its Tonawanda, N. Y.,. plant July 29. The model was a Wright R-3350-26W, developing 2700 horsepower. A second and larger aviation engine, the supercharged R-3350-85 developing 3500 horsepower, is due in November. The Chevrolet aviation engine contract has recently been augmented by government orders for all replacement parts for the engines.

It was revealed that Chevrolet is making 633 component parts for the aviation engines, compared with 1183 parts being purchased from subcontractors and suppliers.

Modern Steel Treating Dedicates Plant

The new plant of Modern Steel Treating Co., Chicago, Ill., was opened at a formal dedication recently. Facilities are said to include 16 furnaces of various types, some of which were designed and built by the company.

Aviation Exposition Again at Detroit

The Fifth Annual International Aviation Exposition will be held at the Detroit-Wayne Major Airport, Aug. 30-Sept. 1. Sponsored by the Aero Club of Michigan, the exposition tentatively plans civilian and military exhibits, and other aviation events.

Arma Fire-Control Order Increased

The Army has authorized Arma Corp. to quadruple its production of the new fire-control equipment for tanks. The authorization allows for an additional start-up commitment in the neighborhood of $7 million.

Gatco Settled in New Plant

Gatco Rotary Bushings Co. has moved to its new plant at 42330 Ann Arbor Rd., Plymouth, Mich. The company was formerly located in Detroit, Mich.

Dial Screw Products Completes New Plant

Dial Screw Products Co., Inc., Woodside, N. Y., recently completed a new plant in Corona, N. Y.

The new plant is said to contain a great deal of added equipment which increases facilities in the Cold Headed and Thread Rolling and Automatic Screw Machines Depts.

The Secondary Dept. has also been enlarged with additional grinding, automatic drilling, milling and broaching machines. The Testing Dept. is complete and equipped with the modern facilities for temperature and humidity controls.

Tingley-Reliance Changes Name

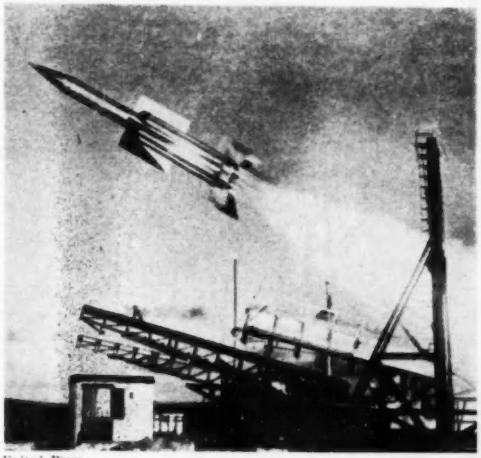
At a special stockholder's meeting of Tingley-Reliance Rubber Corp., Rahway, N. J., recently the name of the company was changed to Tingley Rubber Corporation. At the same time, William H. Rand, treasurer, was made president, and William McCollum, Sr., moved from president to chairman of the board.

1952 U. S. PASSENGER CAR PRODUCTION

(As reported by the car factories)

	July 1952	June 1952	July 1951	Seven Months 1952	Seven Months 1951
Chrysler	4,957	11,079	11,485	71,978	105,070
De Soto	3,515	9,463	8,798	54,618	74,003
Dodge	8,620	23,253	20,902	140,632	207,031
Plymouth	15,085	43,017	42,816	259,147	418,497
Total—Chrysler Group	32,377	87,412	83,701	526,575	804,601
Ford	25,084	67,699	67,138	387,383	569,554
Lincoln	3,241	2,869	2,200	18,721	17,586
Mercury	9,937	17,477	17,784	98,130	153,450
Total—Ford Group	38,262	88,045	87,122	504,214	760,590
Buick	13,586	30,021	30,067	182,628	261,788
Cadillac	7,561	9,960	8,577	54,639	64,715
Chevrolet	21,932	81,753	90,729	483,884	730,343
Oldsmobile	9,283	21,048	21,640	128,482	184,961
Pontiac	12,384	25,258	25,015	154,833	221,461
Total—G. M. Group	64,716	166,980	176,028	1,004,446	1,463,268
Kaiser-Frazer Group	6,222	5,760	5,120	38,096	75,446
Hudson	7,089	6,171	1,308	48,245	74,547
Nash	3,920	17,456	5,942	77,347	97,225
Packard	2,348	5,589	3,975	35,609	49,965
Studebaker	2,901	13,164	15,920	92,125	143,304
Willys	1,748	4,557	1,060	30,592	17,907
Total—All Makes	159,563	395,114	380,166	2,357,249	3,486,753

AND AVIATION INDUSTRIES



United Press

BRITISH ROCKET

The rocket shown being tested in England has boosters which detach after takeoff. It is said to have reached a speed of 2000 mph. A radar beam directs it in flight. The rocket was designed for anti-aircraft defense.

Reo Using Radio on Plant Trucks

Reo Motors, Inc., is one of the first automotive manufacturers to equip its fleet of industrial trucks operating throughout its plants with two-way radio equipment. Communication is controlled through a central station in the traffic department.

Air Force Orders Convair Trainers

A fleet of new T-29D twin-engine bombardier training aircraft has been ordered by the Air Force from Consolidated Vultee Aircraft Corp. Based on design of the T-29B, the planes will carry many of the same instruments the bombardier will find on operational bombers.

Borg-Warner Will Make B-47 Bomber Parts

Norge Div., Borg-Warner Corp., will manufacture parts for the B-47 bomber, it was announced recently. Tooling for production will begin immediately for various types of access doors for the all-jet bomber. Norge is already delivering subassemblies for figher aircraft on previously awarded contracts.

Ordnance Corps Orders More Range Finders

New Ordnance Corps orders for additional quantities of optical tank range finders have raised the backlog at Northrop Aircraft Co. to approximately $55 million, it was recently announced. Other contracts totaling about $9 million are under negotiation.

Pulse-Jet Engine Has 200-Hour Life

A pulse-jet engine with an operating life of 200 hours instead of 40 minutes, has been developed by the Office of Naval Research.

The new engine is expected to find military use, primarily in subsonic, expendable applications, such as the guided missile field. Because the operating life compares favorably with the normal flight time before overhaul of conventional reciprocating aircraft engines and because the engine is light, simple, and easy to construct, it is expected to advance the application of pulse-jet engines to helicopter rotors.

Several aircraft companies now are investigating such applications under Government contracts. The engine is a relatively new type, and the theory of its operation has not been fully determined, the Navy said. It is not practicable at this time, therefore, to predict all of its uses.

Pressed Steel, Checker Awarded Trailer Orders

Pressed Steel Car Co. has received a $9 million order from the Ordnance Corps for heavy-duty, low bed trailers and dollies. The equipment will be built at the company's Jahn Trailer Div. plant in Chicago, Ill.

Checker Cab Manufacturing Co. of Kalamazoo, Mich., has received a $20 million defense contract to build 26,950 1½-ton capacity cargo trailers.

1952 MOTOR VEHICLE FACTORY SALES*

	Passenger Cars	Trucks	Buses	Totals 1952	Totals 1951
January	273,572	101,060	778	375,410	606,633
February	333,885	100,706	625	435,216	818,321
March	373,231	109,173	569	482,973	755,022
April	416,155	112,833	597	529,585	839,272
May	397,636	105,658	423	503,917	652,727
June	408,250	109,976	484	518,710	617,665
Total Six Months	2,202,929	639,406	3,476	2,845,811	3,889,000

1952 MOTOR TRUCK FACTORY SALES BY G.V.W.*

	5,000 lb. and less	5,001-10,000	10,001-14,000	14,001-16,000	16,001-19,500	19,501-26,000	Over 26,000	Total
January	35,127	17,832	5,914	22,409	6,388	9,176	4,234	101,060
February	34,455	18,114	6,251	23,278	5,149	9,132	4,327	100,706
March	38,721	19,452	5,857	24,347	5,692	10,076	5,028	109,173
April	43,393	22,313	5,670	21,959	4,604	10,062	4,832	112,833
May	40,010	22,934	5,676	19,243	4,328	10,033	3,434	105,658
June	43,838	23,756	5,373	19,994	4,242	8,964	3,810	109,976
Total 6 Mos. 1952	235,544	124,400	34,743	131,230	30,381	57,443	25,665	639,406
Total 6 Mos. 1951	338,958	144,964	60,003	144,691	37,014	40,199	20,763	786,592

* Automobile Manufacturers Association.

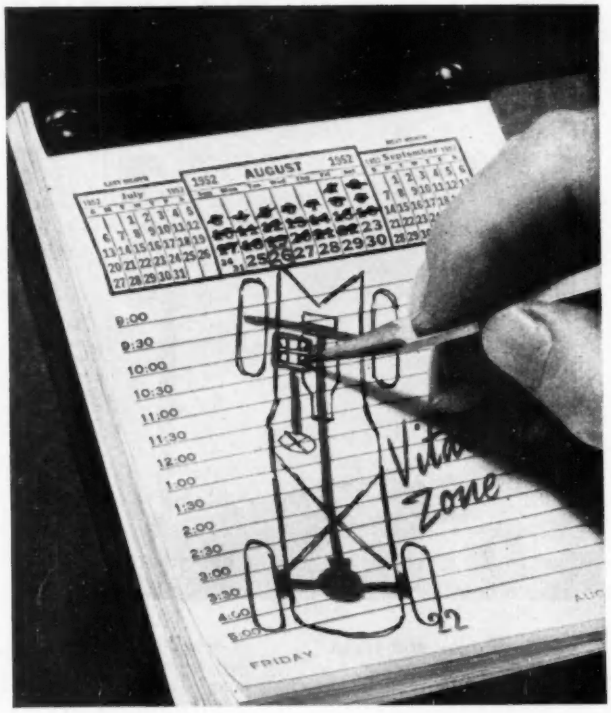
What makes a car worth waiting for?

A CUSTOMER will wait for delivery, if the car he's ordered gives him top value.

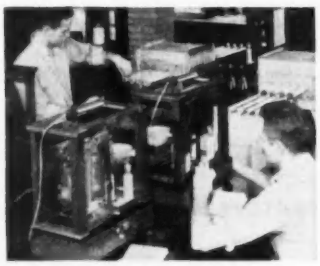
Today's motorist knows that value is worth waiting for. Especially if that value is in the moving parts—the "vital zone". To give customers the "vital zone" value they look for, remember this formula next time you buy component parts.

$$Value = \frac{quality + service + public\ acceptance}{price}$$

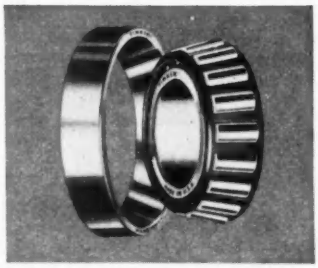
It illustrates that price is just one factor in value and must be weighed in relation to factors *above* the line. Timken® bearings give you more above-the-line advantages than any other tapered roller bearings. In terms of higher quality, better service and greater public acceptance, Timken bearings are lower in price than ever before. The Timken Roller Bearing Company, Canton 6, Ohio.



How TIMKEN® bearings give you value where it counts most . . . in the "vital zone":



MORE THAN 2,000 chemical tests are made daily to guarantee correct physical composition, hardenability, grain size and physical and mechanical properties of the Timken steel used for Timken bearings. This is another reason why Timken bearings give you the most value.



PROOF OF PREFERENCE for Timken bearings where value counts most—in pinions, wheels, differentials, steering gears—the "vital zone"—is that all but two makes of cars have Timken roller bearings on the pinion. And the pinion is the toughest automotive bearing application!

ONLY TIMKEN BEARINGS GIVE YOU ALL THESE VALUE FEATURES

QUALITY

1. Design leadership
2. Steel made in our own mill
3. Precision manufacture
4. Rigid quality control
5. More than 50 years' experience

SERVICE

6. Unequalled engineering service
7. Unequalled research and development facilities for your use
8. Installation service in the field
9. Widest range of sizes
10. Most dependable source of supply

PUBLIC ACCEPTANCE

11. First choice throughout industry
12. Best-known name in bearings
13. Widespread advertising

it's TIMKEN for VALUE

TRADE MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL ◯ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ⓘ AND THRUST →ⓘ← LOADS OR ANY COMBINATION →✳←

Men in the News

Current Personnel Appointments and Changes at Plants of Automotive Manufacturers and Their Suppliers

Illinois Tool Works —Harver O. Edson has been appointed controller.

General Motors Corp., United Motors Service Div.—**W. A. Hagen** has been appointed general sales manager.

Chrysler Corp — **Charles Harmon** was recently made general plant superintendent of the Detroit Tank Plant, while **Roman Andrysiak** is now superintendent of assembly.

Amgears, Inc. — **Lawrence J. Kline** has been elected general manager.

General Motors Corp., Pontiac Motor Div.— **J. Basil Meidlein** has been named traffic director.

Bell Aircraft Corp.—**John W. Rane, Jr.**, was recently named director of contract administration.

Rust Engineering Co.—**D. C. Shaw, III**, has been promoted to secretary.

American Cladmetals Co.—**Henry W. Bauer** was named secretary recently.

Glen L. Martin Co.—**George B. Shaw** was elected vice president in charge of procurement, and **Daniel W. Siemon** was elected vice president in charge of industrial relations recently.

National Screw & Mfg. Co.—**Donn D. Greenshields** was recently elected executive vice president, and **George F. Jenkins** was named vice president in charge of sales.

National Screw & Manufacturing Co. — S. M. Washabaugh has been named director of sales research.

United States Rubber Co., U. S. Tires Div.—**C. H. Schlicter** is now manager, U. S. passenger tube sales.

B. F. Goodrich Co.—**Harold W. Gatt** has become general purchasing agent, and **W. F. Scull** is now director of purchases and traffic.

Cutler-Hammer, Inc. — **Charles G. Sims** was recently named division manager of small motor switch sales.

Chrysler Corp., Detroit Tank Plant —**Elmer C. Dodt** was appointed chief engineer.

Champion Spark Plug Co.—**E. F. R. Horner** was named to the new post of sales promotion manager.

Essex Wire Corp.—**Richard B. Taylor** has become manager of aluminum sales.

Doman Helicopters, Inc. — **C. T. Adams** is now public relations director in charge of advertising.

Morton Machine Works—Arch Morton resumes management of the company.

Chrysler Corp., Dept of Industrial Education—**Frederick J. Lutz** has been named general supervisor of technical training.

General Motors Corp., Fisher Body Div.—**Ivor L. Williams** was recently named senior engineer in charge at the Grand Blanc, Mich., tank plant.

Arrowhead Rubber Co.—**Charles P. Evans** has become works manager of the Downey, Calif., plant.

AP Parts Corp.—**O. A. Roeger** was recently promoted to assistant to the sales manager.

Columbia Steel & Shafting Co., Summerill Tubing Co. Div.—**Col. John Frye** has returned from service as manager of sales.

Eutectic Welding Alloys Corp.—Helmut Thielsch is director of applied welding engineering.

Necrology

Lammot du Pont, 71, former president of E. I. du Pont de Nemours & Co., died July 24.

Frederick Wilhelm Hohensee, 83, pioneer automobile builder and former General Motors Corp. director and general factory manager, died July 24 at Yonkers, N. Y.

Thomas Cruthers, 68, a vice-president of the Worthington Corp., died July 27 in West Orange, N. J.

Paul W. Seiler, 63, president of Seiler & Co. and former president of General Motors Truck Corp., died July 29 at Detroit, Mich.

Charles P. Culhane, 55, general sales manager of United Service Motors Div. of General Motors Corp., died July 19 in Crater Lake National Park, Ore.

David J. Willoughby, 67, former sales executive of the Pierce-Arrow Motor Car Co. and the Studebaker Corp., died July 13 at Buffalo, N. Y.

Ingwold N. Larson, 67, secretary of the Claud S. Gordan Co., died July 9 at Baily Harbor, Wisc.

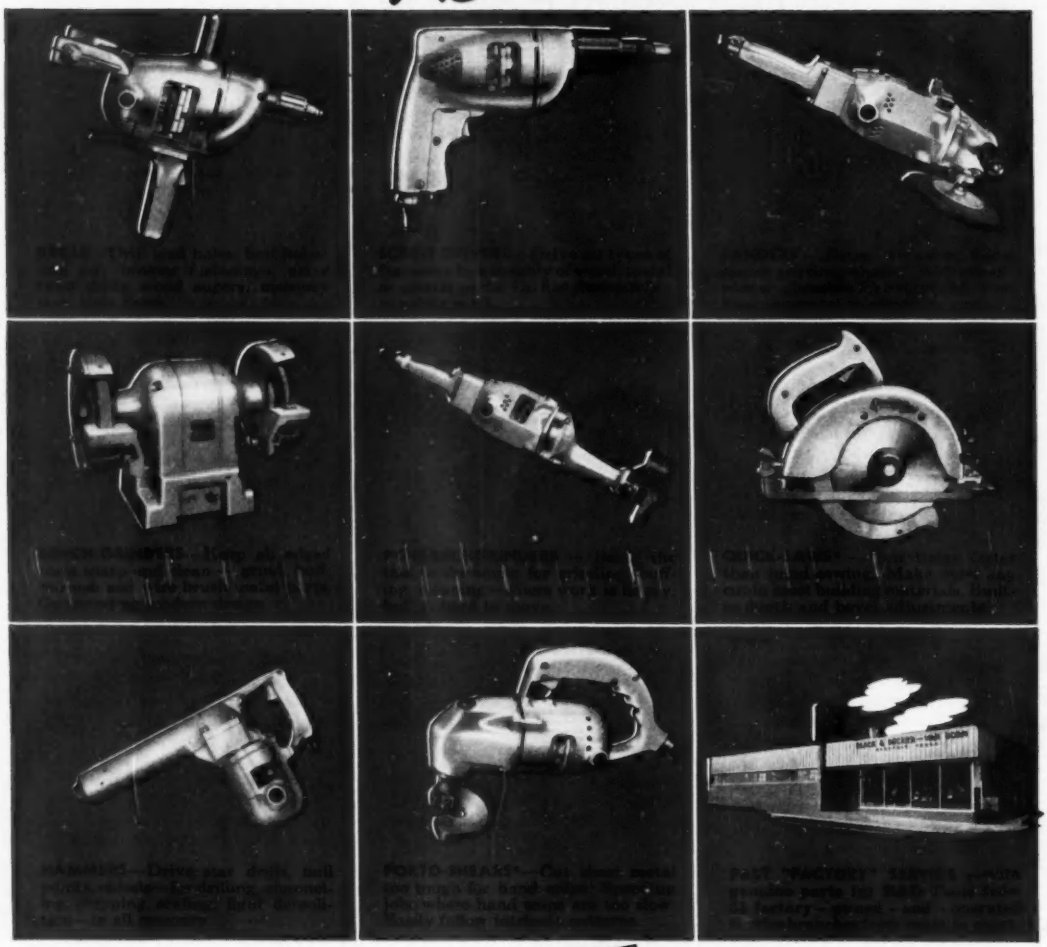
Charles C. Carr, former director of public relations and advertising for Aluminum Co. of America, died July 29, in St. Petersburg, Fla.

Foust Childers, 58, director of public relations and advertising manager of Delco-Remy Div. of General Motors Corp., died Aug. 1 in Anderson, Ind.

FASTER TOOLS

for Production, Maintenance, Construction

by Black & Decker



You name the job and there's a Black & Decker Tool to help you do it better, faster, with fewer man-hours, at lower cost! Check the Tools shown on this page—just a sample of more than 100 in the world's most complete line. Then see your nearby Black & Decker Distributor for eye-opening demonstrations—for full details on their easy handling, abundant power, quality construction—for sound advice on any tooling problem. Learn why it pays to "Switch to Black & Decker POWER!"

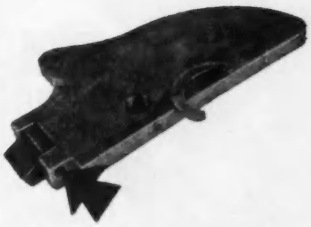
*Trade Mark Reg. U. S. Pat. Off.

WRITE TODAY for new 1952 B&D Catalog. Gives full details on complete line of tools and accessories. Yours free for the asking! THE BLACK & DECKER MFG. CO., 635 Pennsylvania Ave., Towson 4, Maryland.

B&D Black & Decker PORTABLE ELECTRIC TOOLS

AS A SHAFT . . . Rollpin serves as an axle for the sparkwheel of a cigarette lighter. No riveting or threading necessary . . . faster assembly. Note flush, clean fit.

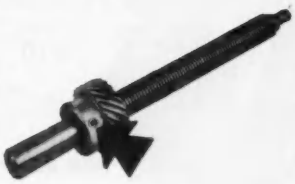
AS A DOWEL . . . Rollpin is used here to prevent rotation of a thrust bearing. No reaming, no special locking. Easily removed. Lowest possible dowel pin cost.



AS A CLEVIS PIN . . . here Rollpin holds firmly in clevis, permits free action of moving member. Rollpin application above is with the plate of a home workshop tool.

AS A KEY . . . Rollpin demonstrates its ability to do away with precision tolerances, in this heating system damper arm. Faster, cheaper and more satisfactory than usual assemblies.

AS A STOP PIN . . . in this application, Rollpin is shown in a ratchet wrench adaptor. With its light weight and high shear strength, Rollpin functions perfectly . . . cuts assembly costs.



AS A SIMPLE FASTENER . . . Rollpin replaces a set screw in pinning a gear to a shaft. Assembly time is shorter, service life longer. Vibration-proof flush fit. Easily removable.

YOUR IMPORTANT FASTENING JOBS

are cheaper . . . faster, with ROLLPIN TRADE MARK

Rollpin is a pressed-fit pin with chamfered ends. It drives easily into holes drilled to normal tolerances, compressing as driven. No reaming, no tapering, no extra assembly steps required. Rollpin fits flush, *locked* in place by the constant pressure it exerts against the hole walls. Can be inserted with automatic press, or by hand—removable with a drift or pin punch.

Rollpin is reusable again and again.

Elastic Stop Nuts with the famous red collar are another ESNA product

ESNA

MAIL COUPON TODAY. If your present operations or plans include the above applications—or set screws, rivets, hinge pins, cotter pins, pivot pins, taper pins—you can't afford to be without complete details on Rollpin. Write now—find out how much faster and cheaper Rollpin can do the job.

Section R1-85, Elastic Stop Nut Corporation of America
2330 Vauxhall Road, Union, N. J.

Please send me the following free information on ESNA self-locking fasteners:

☐ Rollpin bulletin and sample Rollpins ☐ AN-ESNA conversion chart
☐ Elastic Stop Nut Bulletin ☐ Here is a drawing of our product. What fastener do you recommend?

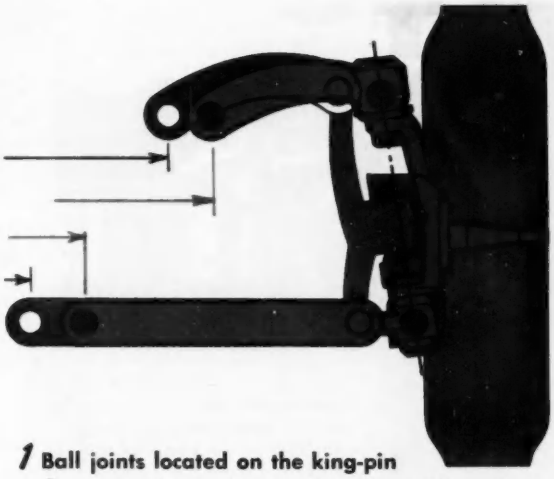
Name _____ Title _____

Firm _____

Street _____

City _____ Zone _____ State _____

BRISTOL
CONNECTICUT
2-9581
CHICAGO
MOHAWK
4-6622
PLYMOUTH
MICHIGAN
2310
Ann Arbor
MICHIGAN
3-4258
DAYTON
KENMORE
5135
CORRY
PENNSYLVANIA
3-8201
Milwaukee
BROADWAY
2-1912
RING
any phone for
SPRING
action . . . .
top 10
SOURCES
for Mechanical
Springs
WALLACE BARNES COMPANY
BRISTOL, CONNECTICUT
THE WILLIAM D. GIBSON COMPANY
1800 CLYBOURN AVE. CHICAGO 14,
RAYMOND Manufacturing COMPANY
CORRY, PENNSYLVANIA
BARNES-GIBSON-RAYMOND
40300 PLYMOUTH RD. PLYMOUTH, MICH.
B-G-R COOK PLANT
ANN ARBOR MICHIGAN
F. N. MANROSS AND SONS CO.
BRISTOL CONNECTICUT
OHIO DIVISION
1712 EAST FIRST ST. DAYTON, OHIO
DUNBAR BROTHERS COMPANY
BRISTOL, CONN.
MILWAUKEE DIVISION
341 E. ERIE ST. MILWAUKEE, WIS.
THE WALLACE BARNES COMPANY LTD.
HAMILTON, ONT. CANADA
DIVISIONS OF ASSOCIATED SPRING CORPORATION AND CANADIAN AFFILIATE



1 Ball joints located on the king-pin line move inner pivots outward, creating extra inches under the hood for wider engine design.

Ball Joint Suspension

1 GIVES MORE SPACE FOR WIDER ENGINES

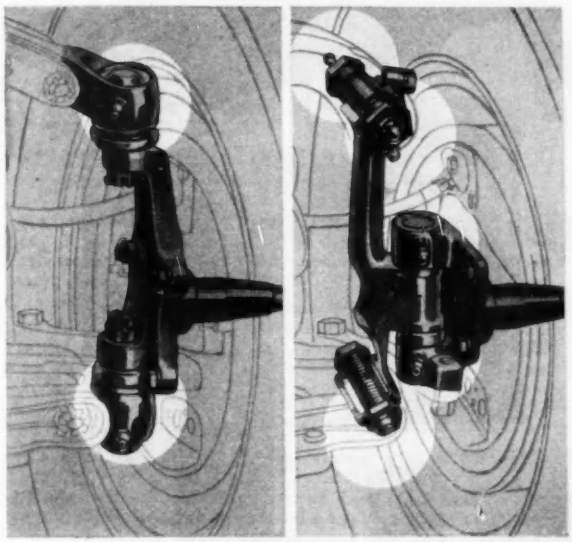
2 REDUCES LUBRICATION SERVICE 75 PER CENT

3 MAKES FRONT WHEEL SUSPENSION INSTALLATION EASIER AND FASTER

ONE GLANCE at the illustrations and you see how valuable inches are saved under the hood! Quick comparison points out the number of lubrication services eliminated. But these are only small points in the over-all story.

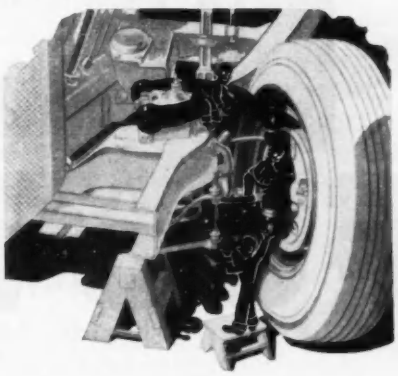
Thompson's Ball Joint Suspension also eliminates front suspension bind. It improves steering; makes handling easier; and prolongs service life. Through weight savings, parts reduction and compact design, Ball Joint Suspension speeds assembly. And in servicing, the equivalent of a complete rebushing job can be done in half an hour because removal of front wheels and bushings, bleeding the braking system and normal realignment are unnecessary.

Let Thompson's "ENGINEERED STEERING" experts help you solve your steering problems. Inquiries from all automotive makers are welcome at Thompson's Detroit Division. Call us at WA 1-5010.



2 Lubrication points are reduced from 12 to 4 by eliminating upper and lower standard threaded bearings, knuckle support, king-pin and its bushings.

3 Only three simple operations are required to assemble or remove the compact service package from the suspension.



Thompson Products, Inc.

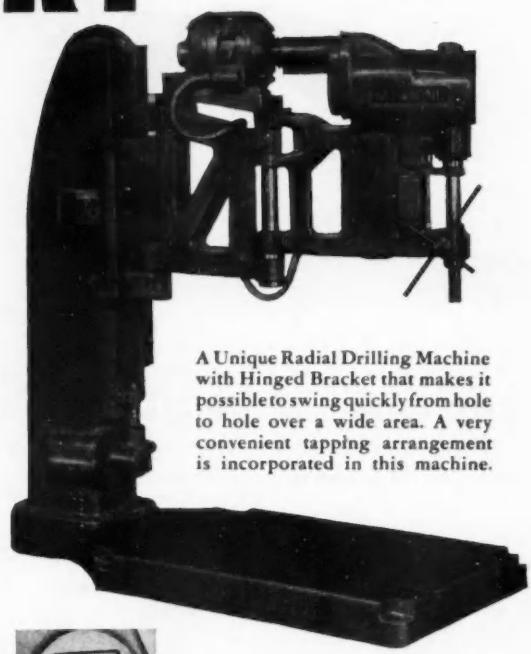
DETROIT DIVISION

7881 CONANT AVENUE • DETROIT, MICHIGAN

FOOTBURT

machine tools for increased production

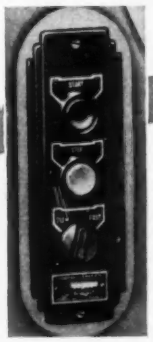
engineered for production

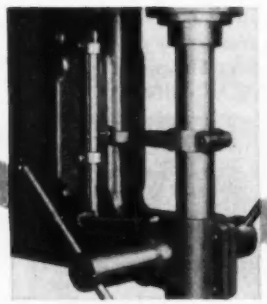


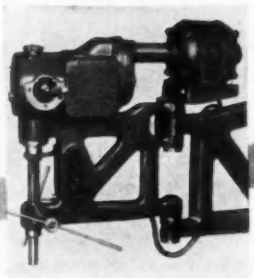
A Unique Radial Drilling Machine with Hinged Bracket that makes it possible to swing quickly from hole to hole over a wide area. A very convenient tapping arrangement is incorporated in this machine.

Here is a machine designed to perform light drilling and tapping operations at high speed with minimum of effort. Any one of six spindle speeds may be quickly selected and tapping is always instantly available without any adjustments to the machine. It makes an excellent choice for miscellaneous work on a large layout of varying size holes.

THE FOOTE-BURT COMPANY, Cleveland 8, Ohio
Detroit Office: General Motors Building





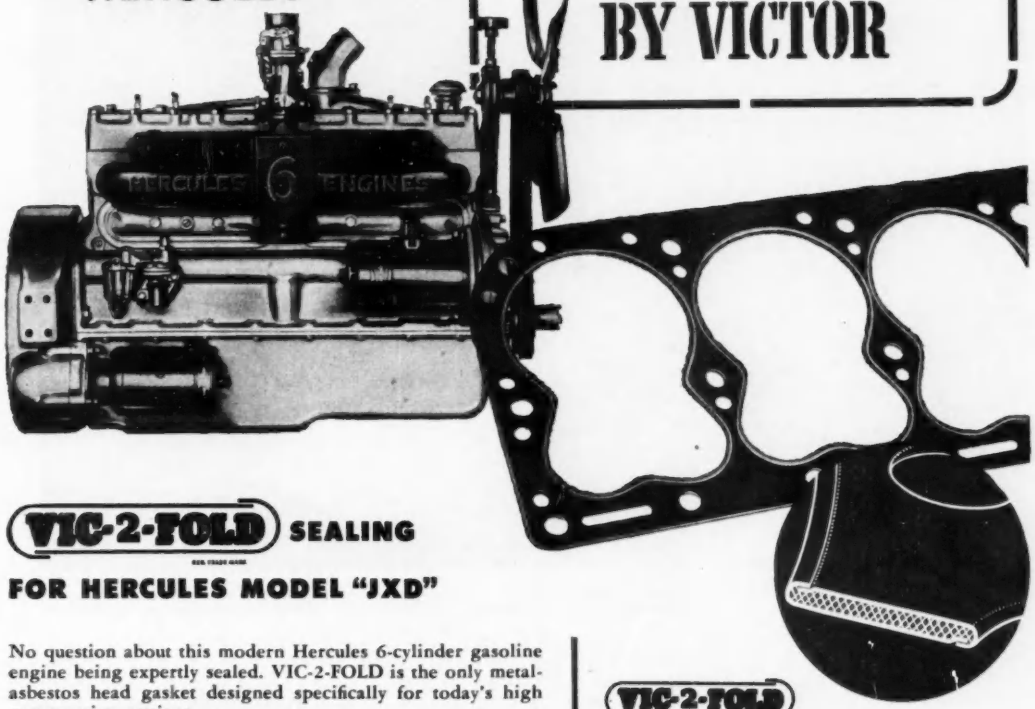


FOOTBURT

machine tools

SEALED TO ORDER BY VICTOR

HERCULES



VIC-2-FOLD SEALING

FOR HERCULES MODEL "JXD"

No question about this modern Hercules 6-cylinder gasoline engine being expertly sealed. VIC-2-FOLD is the only metal-asbestos head gasket designed specifically for today's high compression engines.

VIC-2-FOLD is thin, yet compresses adequately for positive sealing. VIC-2-FOLD is strong and durable by skillful utilization of steel and copper as shown at right. VIC-2-FOLD sealing is equally effective on Valve-in-head or L-head engines, for truck, tractor, or car.

YOU'LL BE SATISFIED WITH VICTOR SERVICE

Wherever your design requires sealing with gaskets, shaft seals, or packings, you'll profit by calling in your Victor Field Engineer. You'll get full benefit of Victor's experience since 1909, and today's leading facilities for developing and manufacturing sealing products to your exact needs. Your inquiry invited; no obligation.

VIC-2-FOLD

THE THIN—YET COMPRESSIBLE METAL-ASBESTOS CONSTRUCTION

Compressible to ¼" average on the engine, VIC-2-FOLD is the thinnest practical metal—encased asbestos gasket construction combining the high strength of steel and corrosion resistance of copper.

Note in the combustion openings how the bottom steel layer is formed up to overlap top copper layer for strong protection against breakdowns and blowouts.

Then note in the coolant openings how the top copper layer is formed down over the steel layer for high resistance to corrosion in contact with coolants and anti-freeze solutions.

Asbestos filler is of the finest long-fiber grade, precision milled and composed in Victor's own plant.

Where can we help you get better sealing?

Victor Manufacturing & Gasket Co., P.O. Box 1333, Chicago 90, Ill.

VICTOR GASKETS AND OIL SEALS

VICTOR

"ORIGINAL EQUIPMENT"

Gaskets and Oil Seals

SEALING PRODUCTS EXCLUSIVELY

By
H. J. Chamberland
Research Engineer
The DoALL Co.

Cutting tires for research and inspection purposes, using a combination of high speed sawing at 3000 fpm and friction sawing at 12,000 fpm for an economical compromise between tool life and cutting rate.

Modern Techniques to Band-Saw Rubber

THE introduction of new types of band saw blades and high speed machines in recent years has simplified the cutting of all resilient and spongy materials, and particularly rubber in all forms and compositions.

Following are recommendations based on a cross-sectional selection of laboratory tests dealing with typical applications in the automotive fields. These customer tests have resulted in the periodic development of better band tools such as the buttress and scalloped-edge blades. As will be shown in the applications, a standard blade of proper pitch and width is frequently used. For sponge rubber, either regular or latex foam, the scalloped-edge blade has no substitute and slices this material like cheese.

Crude Rubber

½ in. Thick

To eliminate any tendency of this material to gum or clog the saw teeth, a coolant composed of ½ pint of glycerine to one gallon of water is recommended and to be applied freely to the saw teeth just above the upper guides. Standard pitch saws are now obsolete to cut this and many other related materials. The ½ in.-3 pitch buttress at a velocity of 4000 fpm will give a cutting rate of 44 lineal inches per minute with a very good finish. These saw control factors are for contouring as well as straight cuts.

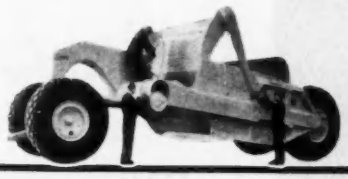
Above recommendations also apply to crude rubber of Government specifications GRM, GRS and GRI70. Cutting rates on these latter types, on a thickness under two in., vary from 260 to 600 sq in. per min with GRM and GRS types exceeding. When some crude rubber shows only a slight tendency to gumming, water at the rate of four oz per min will prove efficient as a coolant.

Synthetic Rubber

1¾ in. Thick

This application involves a small radius and requires a 4 pitch-¼ buttress blade at 3500 fpm. Water

(*Turn to page* 116, *please*)



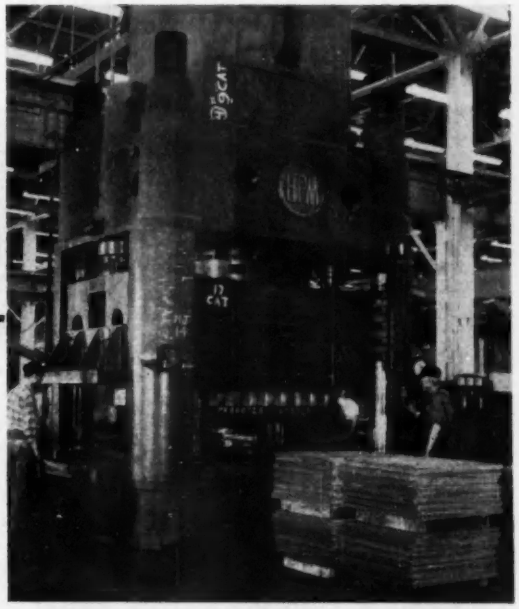


Fig. 1

Large Hydraulic Presses Installed at Caterpillar Plant

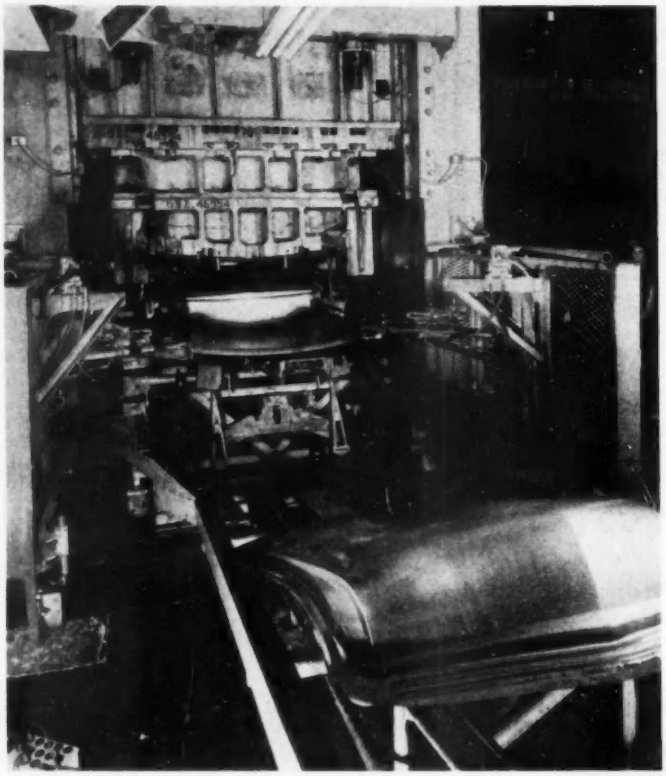
Fig. 2

SEVERAL big hydraulic presses installed in the Joliet plant of Caterpillar Tractor Co. are of interest in view of the expanding use of large hydraulic press equipment. The 2500-ton HPM press, Fig. 1, is used in the forming of large scraper parts, including the draft frame spreader section. The latter part is a big tube up to 14 ft in length which is formed in halves and fabricated onto the front end of the scraper. Reinforcements for scraper draft frames also are formed in this press.

One of the principal features of the HPM press is its control of pressure, permitting variations from full pressure down to 500 tons, dependng upon the requirements of the operation. The press has no cushion or knock-out.

The 2000-ton Lake Erie press, Fig. 2, is of double-action type used for making cable control components as well as various scraper and bulldozer parts. It is used primarily for blanking, forming, and straight forming. One single-action blanking and forming job is on an adapter plate one in. thick. Double-action blanking and forming is performed on cable control covers, employing a knock-out for these parts. In addition, this press is used for straight forming or bending where the cushion and press perform a single-action operation.

Ford Body in



Here is an example of double mechanical hands used for extracting Ford hood stampings from the press. Smaller stampings are extracted with single mechanical hand mechanism.

THE many millions of dollars expended for the modernization of the Dearborn Stamping Plant of Ford Motor Co. have created an advanced facility for producing body stampings. The new program has discarded the old presses formerly on the floor and has greatly expanded press capacity by the installation of many presses of modern design, ranging from single-action equipment of 400-ton capacity to 2000-ton, triple-action Hamilton presses. The program also included rearrangement of some 3100 other items of equipment; and installation of new automatic shears and uncoilers serving the major press lines.

In the acquisition of new equipment emphasis was placed upon smooth, straight line flow

By Joseph Geschelin

Automation is exemplified by the introduction of automatic loading and feeding fixtures serving many presses. In this instance, blanks are loaded on the fixture and then fed automatically into the press die by elevating the fixture.

Parts Made Modernized Plant

of materials, improved materials handling, and development of advanced forms of Automation. To this end, the rearrangement of machinery has resulted in a formal straight line setup for press lines, continuing with related operations and welding stations. At the same time wider traffic aisles have been provided between the press lines for more efficient operation.

Since the press shop is located on the second floor of this building, the movement of materials has been simplified and congestion on elevators and cranes greatly relieved by constructing a ramp and by the use of industrial trucks of various types to replace monorail conveyors for the most part. Long monorail conveyor lines, however, still are employed for the transport of stampings and sub-assemblies to the shipping docks.

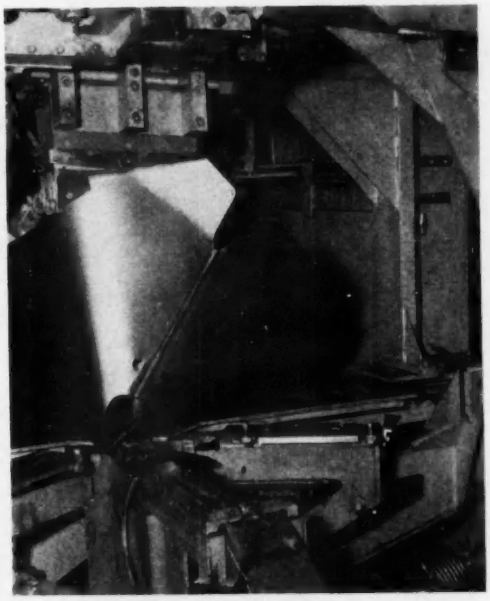
One of the most significant pieces of equipment installed here is the extensive conveyor system for handling scrap from the various press lines. Running some 1200 ft in length, this conveyor line traverses the gallery immediately below the line between first and second operation presses. Scrap from the other presses in the lines at right angle to the conveyor is brought into the main conveyor by means of shorter feeder lines. The main conveyor, in turn, transports the scrap to one end of the building where it is fed to two scrap balers.

One of the balers, representing the most modern type built, is of three-slide construction, served by two hydraulic pumps, and capable of high productivity.

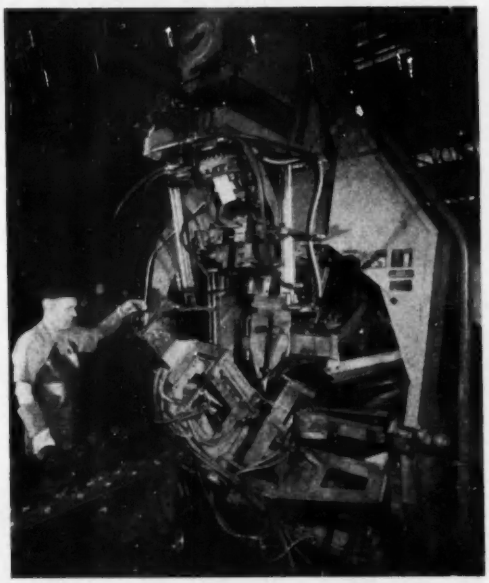
Ford has encouraged, in fact, insists upon improvements in press design to meet the requirements of higher productivity in keeping with the principles of Automation; greater daylight opening to facilitate die handling; and faster operating cycles. Generally speaking, cycles of new presses are at least 25 per cent over the speeds considered feasible heretofore.

Among the presses now in operation are those built by Bliss, Clearing, Cleveland, Danly, and Hamilton. Largest of these are 200-in. bed presses of triple-action design, rated at 2000-ton capacity. An outstanding feature of these units is the adoption of Dynamic drive which provides precise and automatic control of the operating cycle, and is materially responsible for the increase in operating speed.

Die design also has been greatly improved for better accuracy and longer life. In addition, all dies

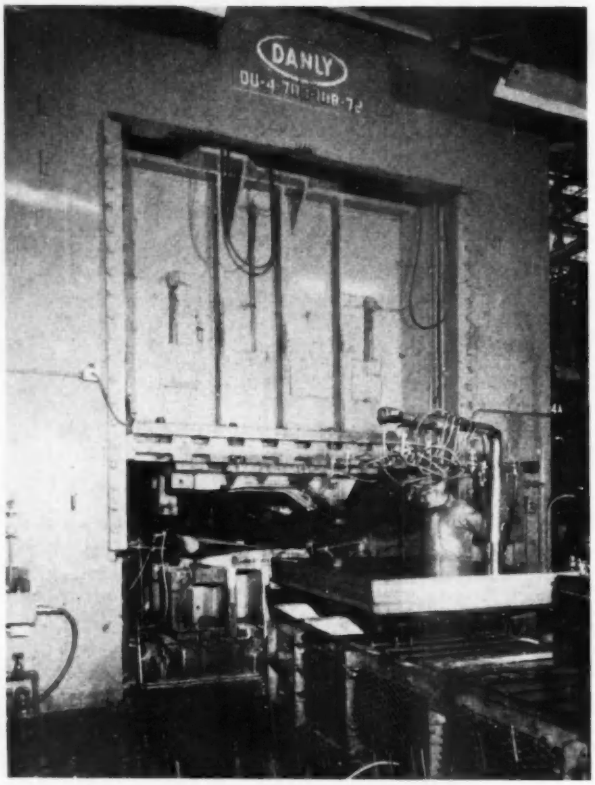


View of Mercury front fender forming machine with blank in place just after seam welding.



Front view of the enormous forming and seam welding machine developed for welding the nose section of Mercury front fender blanks. The mechanism directly in front is moved upward for the forming operation.

Ford Body Parts—continued ....



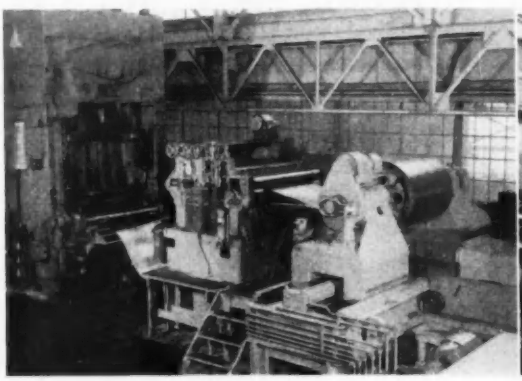
Closeup of one of a number of heavy duty presses installed at Dearborn. This one, rated 700-ton capacity, is set up on the Ford door panel line.

are fitted with scrap cutters for reducing scrap metal to convenient lengths. Dies also include provision for automatic knockout of stampings to facilitate the operation of Automation devices.

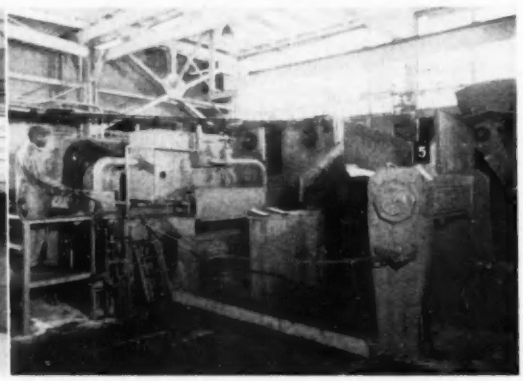
Automation—the major contribution to press economy—represents a marked advance over the earlier techniques devised by Ford immediately after the war. Originally, Ford employed the large "iron hand" or mechanical hand mounted vertically from the top of the press. In the main this has given way to simpler and more compact arrangements of automatic devices. Depending upon the nature of the problem, some of the mechanical hand mechanism is mounted on an individual stand, directly on the floor, and pivoted in the horizontal plane right at the point of application. In other instances, the mechanism is mounted horizontally in the rear and operates with a direct horizontal motion. Still another arrangement is being applied on the larger presses. Here the mechanical hand is mounted on an inclined platform at the rear of the press and operates with a horizontal stroke along the inclined plane.

Simple but effective turn-over fixtures have been developed to roll over the stamping from the first operation. In operation, the stamping is unloaded by means of the mechanical hand, then dropped directly onto the roll-over fixture. This, in turn, drops the stamping onto the power-driven conveyor feeding the second operation press. In

One unit of a large battery of uncoilers and square shears recently installed in the Dearborn stamping plant.



Closeup of the large scrap baler recently installed here. A portion of the new scrap conveyor may be seen in the background above the machine.



several instances, the turn-over fixture is of gravity type requiring no power for its operation except for the inertia of the stamping as it is ejected by the hand.

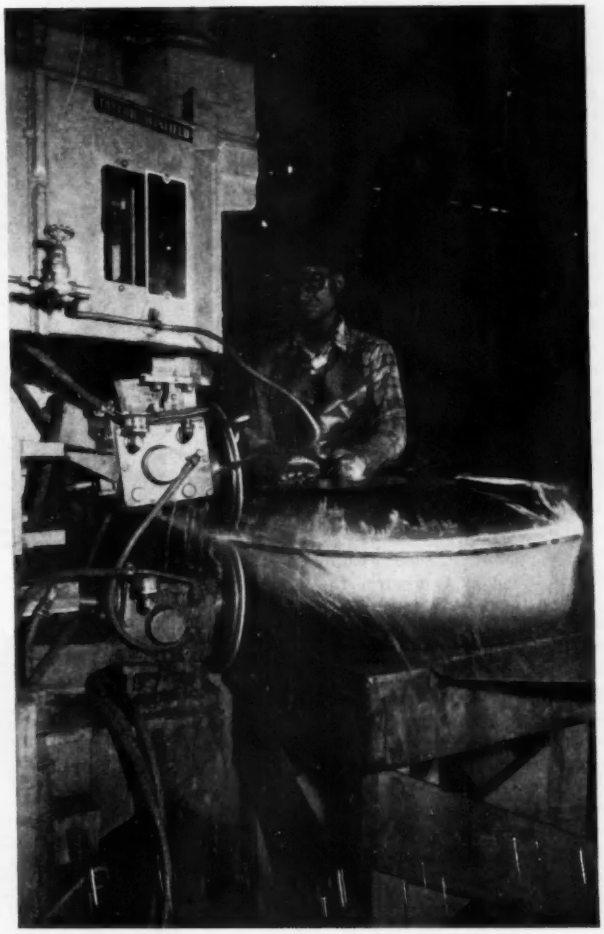
As will be noted from the illustrations, the movement of work from one press to another and from one operation to another — as in the case of welding stations—is effected by power-driven conveyor sections of chain or belt type.

Typical of the straight-line layout of fabrication lines is the door line illustrated here. The floor plan shows one pair of door lines—one for the inner panel, the other for the outer panel. The outer panel line starts with a 700-ton press and progresses through a line of four presses. At the rear of the draw press is the pivoted type mechanical hand which drops stampings onto the roll-over. The arrangement of power-driven feeding devices through the presses may be visualized from this floor plan.

Later on the inner and outer panels are brought together on a common conveyor, clinched together in a press, then spot-welded to form an integral sub-assembly.

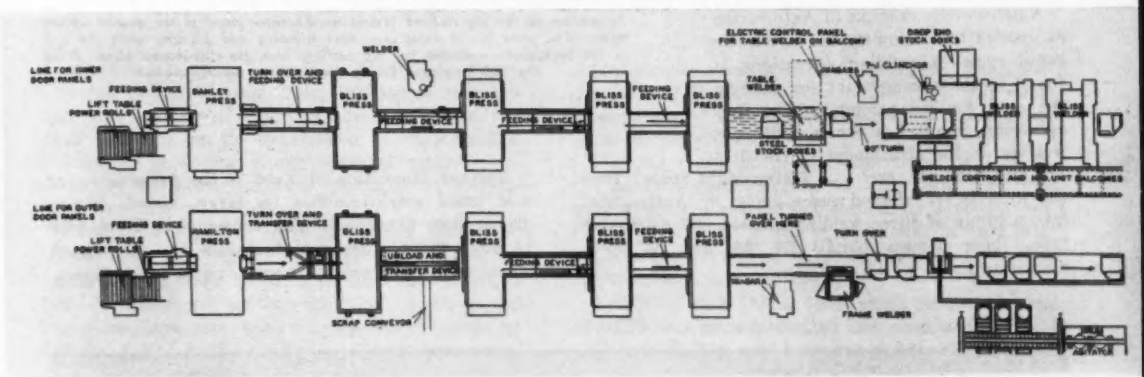
Just before clinching the inner panel goes into a large multiple spot welding press where a number of reinforcements are welded on. The outer panel goes into a special machine arranged for automatically spraying mastic sound deadener.

The quarter wheelhouse inner panel is produced in the form of a single



This is the seam welding operation for joining inner and outer panels of the quarter wheelhouse.

Details of floor plan for one part of door lines. Line at the top is for inner panels; the one at the bottom is for outer panels.



circular dished stamping in the first operation press of 700-ton capacity. The stamping is unloaded by means of a mechanical hand, then goes through two inclined presses for piercing and separating into two sections.

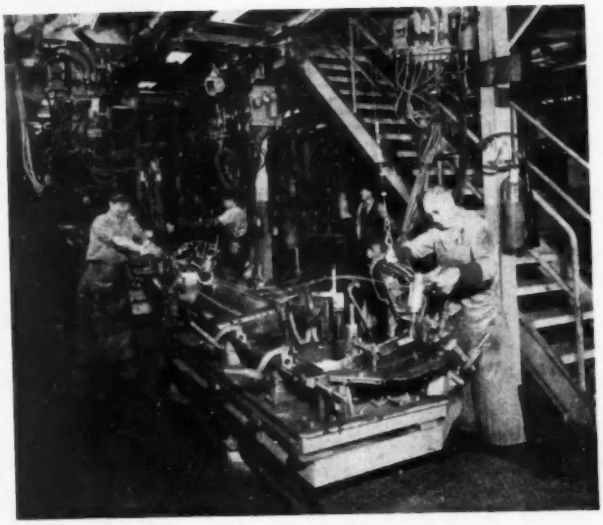
Farther along the line, the inner and outer wheelhouse sections are tack-welded together, and then are seam-welded in special welding machines.

Mercury front fenders, which require a considerable gather at the nose sections, now are made by a process current in the industry since the war. The large blank is prepared with a special cut-out at the nose end—a large V-section. The blank then is placed in the special forming and welding fixture, illustrated here. As the front end of the fixture is actuated in its upward movement, it gathers the front section of the blank into a cone, and at the end of the stroke a seam-welding roller comes into play to produce the welded joint. Although this technique has been used by other manufacturers, the noteworthy feature of the Ford job is said to be in the advanced and simplified design of the forming and welding fixture.

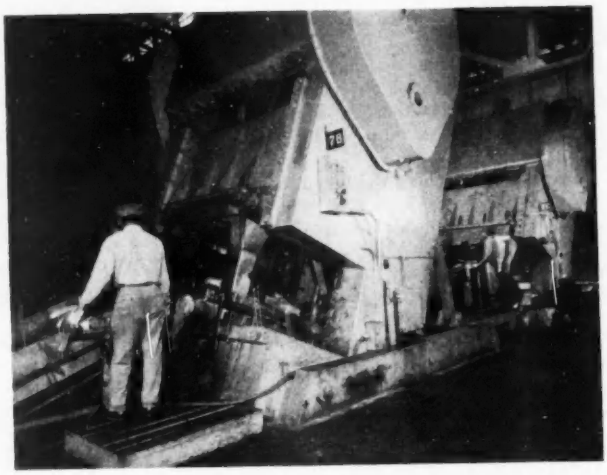
Ford front fenders, on the other hand, are fabricated in the usual fashion, then have a front panel welded onto the main stamping to produce the nose section. The main stamping is drawn in an 800-ton press. Blanks are loaded on a fixture which is pivoted in such fashion as to tilt the blank at the proper angle and elevation for feeding directly into the die.

Incidentally, the front end stamping is welded onto the fender panel in two operations in a special welder. The first operation is to spot weld and this is followed by heliarc welding of the same joint.

A noteworthy example of Automation as applied to a complete and extremely rapid cycle of welding operations is found in the arrangement for welding the cowl top sub-assembly. The first operation, handled in small multi-spot welders, is the attachment of the drip rail and heat bar, each one taking eight spots. Then the work is transferred successively, by Automation, into a group of three welding presses. Of multi-spot type, these presses handle 34, 36, and 54 spots respectively.



Ford side panel sub-assemblies are made up by welding on this fixture type moving assembly conveyor.



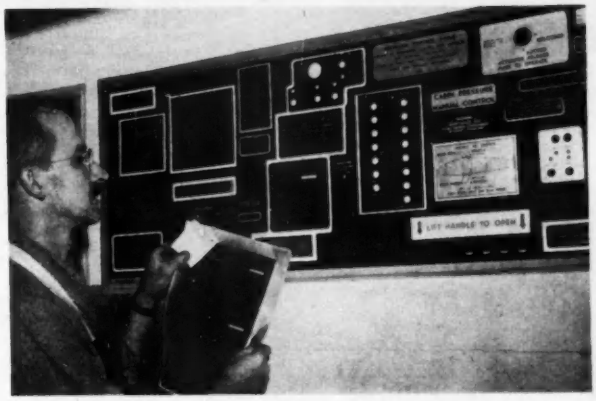
Perspective of two big inclined presses on the outer panel of the quarter wheelhouse. The press in the foreground does trimming and piercing while the one in the background separates the two sections from the dish-shaped blank. Note the belt conveyor linking these presses in Automation.

Another innovation at Ford is the preparation of side panel sub-assemblies on large, closed, power-driven floor conveyors. The conveyor is fitted with 14 large fixtures designed to handle the subdivision of assembly and welding operations at each station.

Aluminum Decals Require No Fasteners

A METAL decal to carry operating instructions, trade marks, and firm names on automotive and aircraft equipment has been developed by Boeing Airplane Co. It requires no drilling of holes to apply screws, rivets or other fastenings, and is said to be virtually permanent from the standpoint of standing up under ordinary wear.

It was Boeing's desire to find a decal more durable than the paper ones then in use that led to the use of paper-thin aluminum in making the new self-adhesive nameplate which now is available to industry generally. Although Boeing's Seattle Division still makes the metal decals for its own use, turning out from 1500 to 2000 of them for each big airplane, it has licensed the C & H Supply Co., Seattle, to manufacture them for general use. They are sold under the trade name of "Metal-Cal."



The aluminum decals shown here carry operating instruction for aircraft equipment and accessories.

The decals are said to have proved themselves virtually abrasion-proof, for under the Tabor test they remained legible after 18,000 wearing cycles, compared with paper decals which are illegible after 1000 cycles. Backed with a cellophane-protected adhesive, the decals adhere solidly to any smooth surface, such as steel, glass, porcelain or wood.

• • •

Flash Welding of Titanium Alloys

By Dr. I. A. Oehler

Director of Metallurgy and Research, American Welding & Mfg. Co.

EXPERIENCE at the American Welding & Manufacturing Co. in Warren, Ohio, has shown that the flash butt welding of titanium alloys is one of the lesser problems in the fabrication of these alloys. Satisfactory welds that closely approach parent metal properties are being regularly produced on conventional hydraulic machines.

Initial work was done early in 1949 on samples of commercially pure ½ in. diameter rod supplied by the Remington Arms Division of Du Pont. Excerpts from the report at that time show that: 1. No protective atmosphere was used. 2. Specimens tested to destruction had ductile fractures adjacent to the weld in the parent material. 3. The weld zone in the as welded condition was acicular in structure. 4. Annealing at 1650 F refined this structure. 5. All welds appeared sound with no inclusions or voids apparent in the microstructure.

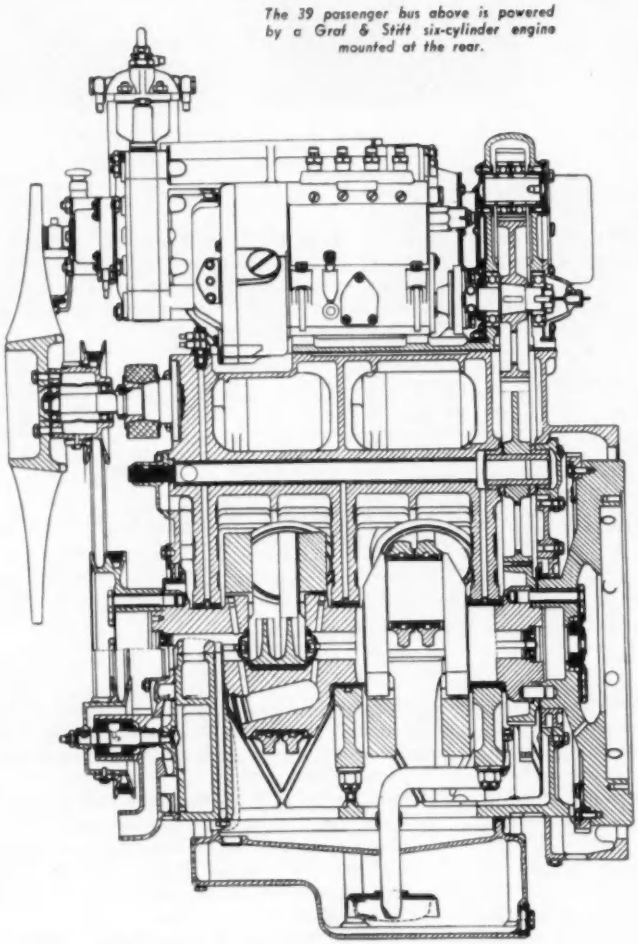
Flashing travel of ¼ in., upset travel of 7/16 in. and final die opening of ¼ in. were used. The total welding cycle consumed five seconds at a voltage setting of 2.9 volts. Speed of upset was of particular importance, and fast speeds, comparable to those used for aluminum, were employed.

Following these initial tests, small production runs of RC70 bars were fabricated into rings and the joint flash welded. The weld burr was chipped off while hot.

(*Turn to page* 154, *please*)

New Powered

The 39 passenger bus above is powered by a Graf & Stift six-cylinder engine mounted at the rear.



Longitudinal section of the Graf & Stift four-cylinder, V-type Diesel.

AUSTRIA has reentered the automotive field with a line of trucks and buses produced by Graf & Stift, of Vienna. These new vehicles will be powered by four and six cylinder, V-type, two-stroke Diesels of loop scavenging type. The two engines, designed by Professor Hans List, of Graz, Austria, are similar in design, each having a bore and stroke of 4.73 in. by 5.51 in., and a compression ratio of 16.5 to 1. The four cylinder model has a maximum output of 120 hp at 1900 rpm, and its maximum speed is governed to 2000 rpm.

The cylinders and upper half of the crankcase are a light alloy casting, in which centrifugally-cast iron liners are fitted. These cylinder liners have milled ports, five inlet and three exhaust. The lands between the exhaust ports are provided with longitudinal passages for cooling water.

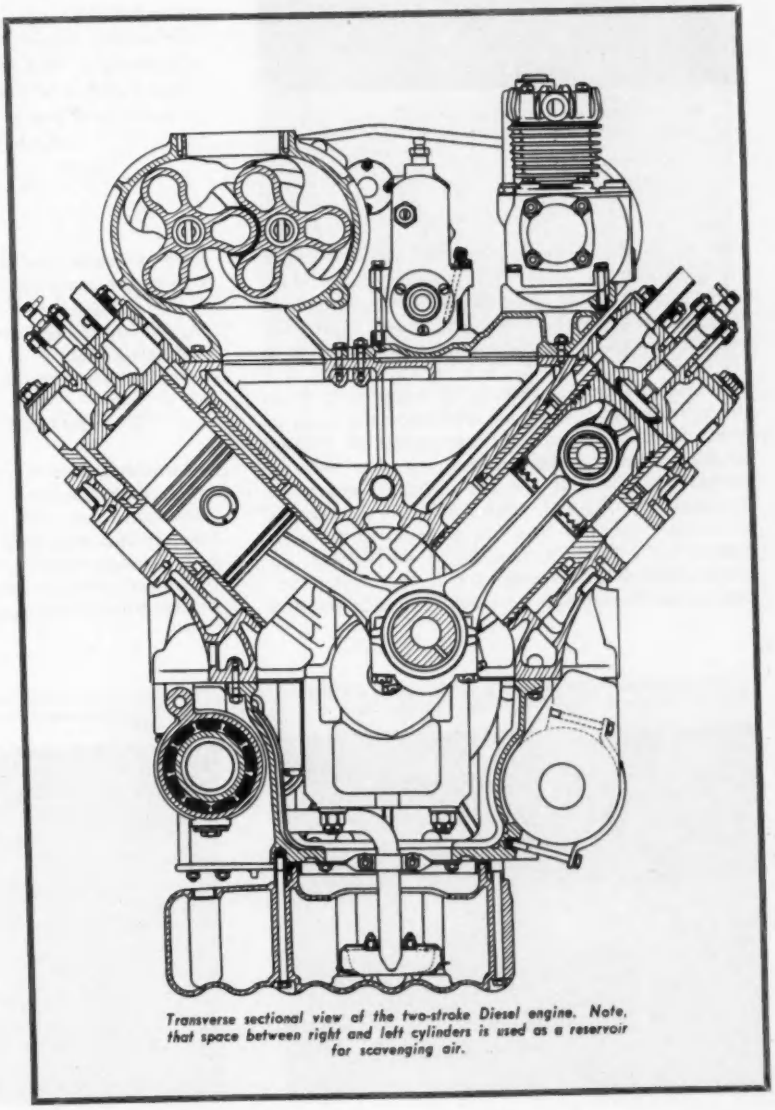
Cylinder heads are individual aluminum alloy castings, the combustion chamber being a recess in the head. The short, stiff counterweighted crankshaft for the four cylinder model is carried in three bearings.

Austrian Trucks and Buses by V-Type Diesels

By W. F. Bradley
Special European Correspondent for AUTOMOTIVE INDUSTRIES

Main and connecting rod bearings are steel shells, lined with lead-bronze. The drop forged connecting rods are mounted side by side and have diagonally split caps with two bolts. Pistons are flat-topped, cast silicon - aluminum alloy, fitted with four compression and two oil rings. Piston pins are needle bearing mounted.

Additional stiffness is given to the cylinder block by using the inner space formed by the Vee as a reservoir for scavenging air. This housing extends up to the top of the cylinder block. At the flywheel end there is a housing for the gears driving the Roots-type blower, the injection pump, the generator, and the oil pump. The three - lobed Roots-type blower runs at 1.51 times engine speed. The injector pump is of Austrian make, but the multi-hole injection nozzles are supplied by C.A.V., of London. Injection pressure is 2600 psi and normal delivery from the pump begins at 25 deg before top dead center. It does not need adjustment in service. The electric generator and the air compressor are in tandem on the top of (*Turn to p. 80, please*)



Transverse sectional view of the two-stroke Diesel engine. Note, that space between right and left cylinders is used as a reservoir for scavenging air.

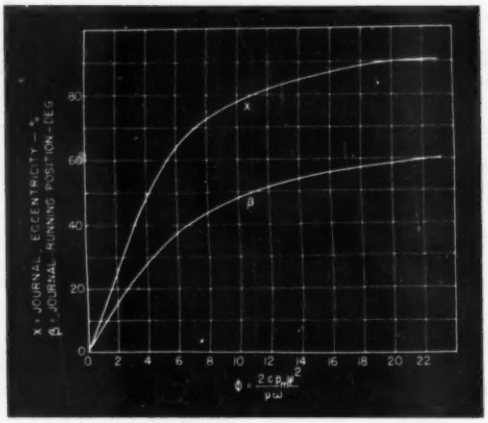


Fig. 1—Relation between the proportionality factor ϕ, the journal running position β and journal eccentricity x.

Load Carrying

An Analysis of the Influence of Length-Diameter Ratio on the Load Carrying Capacity of Journal Bearings. In this Article the Author Considers Rigid Materials, the Influence of Elasticity of the Materials, the Effect of Surface Finish, and the Decrease in Load Carrying Capacity When a Circumferential Groove is Cut in the Bearing.

THE theoretical approaches to bearing design are based on the results of carefully conducted experiments. The classical approach by Osborne Reynolds[1] was based on the experiment of Towers[2] and states some of the most important corollaries in the behavior of a lubricant in a journal bearing. The extension of Reynold's theories by Sommerfeld[3] made the hydrodynamic theory of lubrication the basis of sound bearing design. The experiments of Vieweg[4] on the journal running position were the basis of further expansion of the hydrodynamic theory of lubrication by Gümbel,[5] which resulted in a somewhat more valid approach than the assumptions made by Sommerfeld. Gümbel's treatise of the subject, although rigid, is not as formidable as that of Sommerfeld and is, therefore, more easily applied to practical design problems. An important extension to Gümbel's work is presented by Falz[6] who took into consideration the elasticity of the materials of construction and the consequent deflection of the journal under the applied load.

The statement that the

$$l/\text{d ratio}\left(\frac{\text{bearing length}}{\text{journal diameter}}\right)$$

for maximum load carrying capacity is approximately 0.7 appears frequently in the literature and apparently stems from the work of Falz. It is not clear whether this statement refers to unit load or total load carrying capacity, nor whether this may be an important consideration. In explaining the curve of l/d vs. permissible load, usually given in support of

Fig. 2—Schematic diagram of journal running β, and film thickness h for rigid materials of construction.

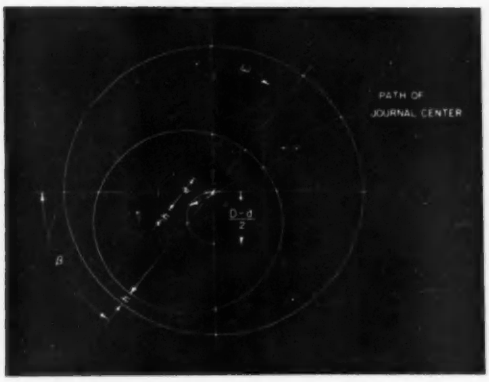
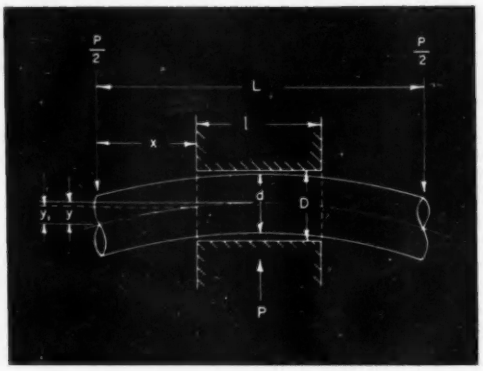


Fig. 3—Schematic diagram of journal deflected under load P and decrease in film thickness at end of bearing.



Capacity of Bearings

By C. J. Vogt
Professor of Mechanical Engineering
University of California

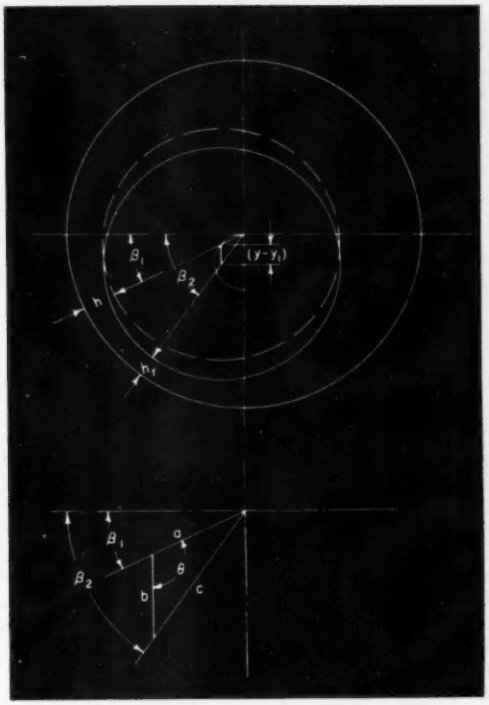


Fig. 4—Diagram showing reduction in film thickness at end of bearing from a value of h to h_1 due to the deflection of the shaft a distance $b = (y-y_1)$.

the foregoing statement, the authors state in effect that the load carrying capacity drops off very rapidly as '*l*' is reduced and considerably less rapidly as '*l*' is increased, therefore the effect of a circumferential oil groove is to divide a bearing with high *l*/d ratio into two parts of reduced *l*/d ratio and consequently increased load carrying capacity. Such statements are misleading and reveal a misconception of the basic theories.

If Reynold's and Sommerfeld's assumption, that the materials of construction are rigid under all conditions of operation, were valid in practice, then the (*l*/d) ratio would be of no concern in bearing design. End leakage of oil would decrease with increase in the ratio of (*l*/d) and with it a proportionate increase in the unit and total load carrying capacity of the bearing. Under these conditions, the ideal bearing would be the longest permitted by the physical limitations of the equipment.

Rigid Materials of Construction

Falz shows that the running position of a journal in a full bearing can be described by a dimensionless

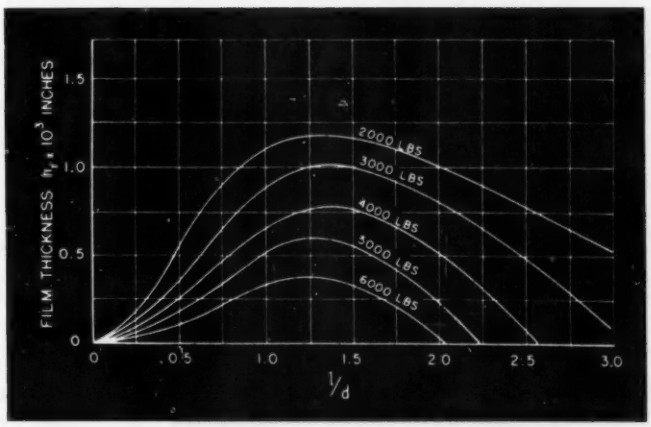


Fig. 5—The reduced value of film thickness h_1 and its relation to the length-diameter ratio l/d due to shaft deflection under various values of total load P.
Shaft length between supports L = 15 in.
Journal diameter d = 2.250 in.
Bearing diameter D = 2.253 in.
Viscosity of oil $\mu = 7.1 \times 10^{-6}$ lb sec/in².
Journal speed N = 2000 rpm

factor ϕ which is given by the relation

$$\phi = 2C\psi^2 \left(\frac{p_m}{\mu\omega}\right) \quad \cdots\cdots\cdots\cdots \quad (1)$$

where

$C = \frac{d + l}{l}$ a correction factor for (finite l/d ratio), and resulting oil leakage at the ends of the bearing dimensionless

d = journal diameter, in.

l = bearing length, in.

$\psi = \frac{D - d}{d}$ the diametral clearance ratio, dimensionless

D = the bearing diameter, in.

p_m = mean load on projected bearing area, lb/in.^{2}

μ = absolute viscosity of the oil, lb sec/in.^{2}

ω = angular velocity of the journal, radians/sec

Equation (1) is the reciprocal of ZN/p, the conventional criterion used to measure bearing performance in consistent units to yield a dimensionless group, and is further modified by the factor 'c' to correct for end leakage (e.g. finite l/d) and by the factor ψ for clearance. Having determined the numerical value of ϕ, information may be obtained from Fig. 1 to evaluate the running position of the journal in the bearing. Since the proportionality factor ϕ (Fig. 1) is a function of l/d expressed by c, the clearance D-d/d expressed by ψ, the unit load p_m, the absolute viscosity of the lubricant at operating condition μ, and the angular velocity ω, then ϕ will have a finite value for any given set of conditions. Therefore, for every value of ϕ the journal assumes a singlar operating position in the bearing fixed in terms of the bearing coordinates by the angle β and per cent eccentricity. As is evident from a study of Fig. 1, equation (1) may be used to determine the load on the bearing or required viscosity of the oil, for any desired operating position of the journal in the bearing (Fig. 2). The oil film thickness at the point of nearest approach of the journal to the bearing is given by

$$h = (1 - x)\frac{D - d}{2} \text{ in.} \quad \cdots\cdots\cdots \quad (2)$$

where

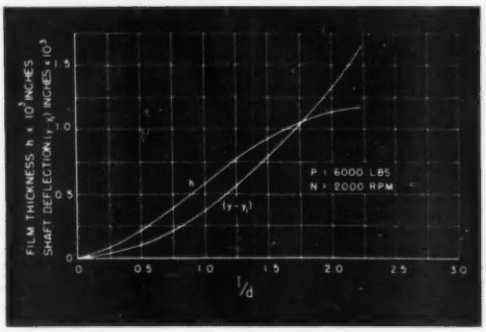
x = eccentricity of the journal in per cent (Fig. 1)

D = bearing diameter, in.

d = journal diameter, in.

The foregoing discussion is based on rigid material of construction.

Fig. 6—The increase in film thickness h with increase in the length-diameter ratio l/d assuming a rigid shaft, and the shaft deflection (y-y$_1$) at the end of the bearing considering elastic shaft material.



Influence of Elasticity of the Materials of Construction

If the elasticity of the journal material is considered, and the deflection of the shaft treated as a simple beam (Fig. 3), then since the bearing is not deflected the film thickness h (equation 2) is further reduced to a value h_r (Fig. 4). The determination and significance of the shaft deflection is best illustrated by a numerical example.

A 2.250-in. diameter journal 15 in. between supports operates in a 2.253-in. diameter bearing at a speed of 2000 rpm. The absolute viscosity of the oil is 7.1×10^{-6} lb sec/in^2. (This is in the range of S.A.E. 40 oil at 130 F). The length of the bearing is 2.25-in. and it carries a total load of 6000 lb.

Since the total load P = 6000 lb the unit load

$$p_m = \frac{P}{l \times d} = \frac{6000}{2.25 \times 2.25} = 1184 \text{ lb/in.}^2$$

The diametral clearance ratio

$$\psi = \frac{D - d}{d} = \frac{2.253 - 2.250}{2.250} = 1.33 \times 10^{-3}$$

$$\psi^2 = 1.777 \times 10^{-6}$$

$$C = \frac{d + l}{l} = \frac{2.25 + 2.25}{2.25} = 2.0$$

$$\omega = \frac{2\pi N}{60} = \frac{2\pi \times 2000}{60} = 210 \text{ radians/sec}$$

$$\phi = 2C\psi^2 \frac{P_m}{\mu\omega} \quad \cdots\cdots\cdots\cdots\cdots\cdots\cdots \quad (1)$$

$$\phi = 2 \times 2 \times 1.777 \times 10^{-6} \times \frac{1184}{7.1 \times 10^{-6} \times 210} = 5.63$$

from Fig. 1 for $\phi = 5.63$; $\beta = 36.5°$ x = 0.62%

$$h = (1 - x)\frac{D - d}{2} \quad \cdots\cdots\cdots\cdots\cdots\cdots \quad (2)$$

$$h = (1 - 0.62)\left(\frac{0.003}{2}\right) = 5.7 \times 10^{-4} \text{ in.}$$

The maximum deflection of the shaft (Fig. 3) is given by

$$y = \frac{PL^3}{48EI} \quad \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots \quad (3)$$

where

P = total load lb

L = length between supports = 15 in.

E = modulus of elasticity 30×10^6 lb/in.^{2}

I = section moment of inertia in.^{4}

$$I = \frac{\pi d^4}{64} = \frac{\pi (2.25)^4}{64} = 1.26 \text{ in.}^4$$

$$y = \frac{6000 \times (15)^3}{48 \times 30 \times 10^6 \times 1.26} = 11 \times 10^{-3} \text{ in.}$$

The deflection of the shaft at the end of the bearing (Fig. 3) is given by

$$y_1 = \frac{PL^3}{16EI}\left(\frac{x}{L} - \frac{4}{3}\frac{x^3}{L^3}\right) \quad \cdots\cdots\cdots\cdots\cdots\cdots \quad (4)$$

$$y_1 = \frac{6000 \times (15)^3}{16 \times 30 \times 10^6 \times 1.26}\left(\frac{6.375}{15} - \frac{4 \times 6.375^3}{3 \times 15^3}\right)$$

$$= 10.65 \times 10^{-4} \text{ in.}$$

Solving for C (Fig. 4)

$$C^2 = a^2 + b^2 - 2ab\cos\theta \quad \cdots\cdots\cdots\cdots\cdots\cdots \quad (5)$$

$$\cos\theta = \cos(\beta + 90^\circ) = \cos 126.5^\circ = -0.5948$$

$$a = x\left(\frac{D-d}{2}\right) = 0.62 \times \frac{0.003}{2} = 0.93 \times 10^{-3} \text{ in.}$$

$$b = y - y_1 = (11 - 10.65) \times 10^{-4} = 0.35 \times 10^{-4} \text{ in.}$$

Substituting into equation (5) and solving

$$C^2 = 1.3737 \times 10^{-4}$$

$$C = 1.171 \times 10^{-2} \text{ in.}$$

The film thickness h reduced by the deflection of the shaft to a value h_r (Fig. 4) is

$$h_r = \frac{D-d}{2} - C = 0.0015 - 0.00117 = 0.33 \times 10^{-3} \text{ in.}$$

The results of this calculation, repeated for several values of l/d from 0 to 3.0, and five values of total load on the bearing in pounds, are plotted in Fig. 5. The curves indicate that for l/d = 0, which represents a knife edge, the load carrying capacity is zero. As the bearing length is increased (journal diameter constant) and with it the ratio l/d, the minimum film thickness h_r is also increased to a maximum value at l/d approximately equal to 1.3. This increase is due to a progressive decrease in leakage of oil from the end of the bearing as l is increased and a resulting increase in support of the shaft on the oil film. At values of l/d greater than 1.3 the minimum film thickness h_r decreases due to shaft deflection increasing at a rate greater than that with which the oil film thickness increases. At the point where, due to shaft deflection, the journal contacts the ends of the bearing, the film thickness is again zero resulting in metal-to-metal contact and ultimate bearing failure. This occurs at l/d greater than 2.0 for the conditions assumed (Fig. 5).

Figure 6 illustrates the increase in film thickness h for rigid materials of construction, and shaft deflection (y-y1), as a function of the ratio l/d for a total load of 6000 lb and speed of 2000 rpm. At a value of l/d of 1.75 the increase in oil film thickness is offset by (or equal to) the shaft deflection. At values of l/d greater than 1.75 the effect of shaft deflection offsets the increase in film thickness and finally ruptures the oil film at the end of the bearing at l/d = 2.05 as indicated in Fig. 5.

Figure 5 illustrates the effect of shaft deflection on the load-carrying capacity of a journal and bearing in which the surfaces have been considered as mathematically smooth. The ratio l/d at which the film thickness $h_r = 0$ represents the condition at which the journal contacts the ends of the bearing.

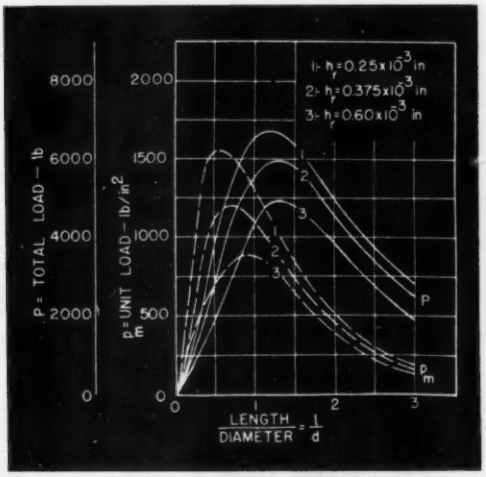


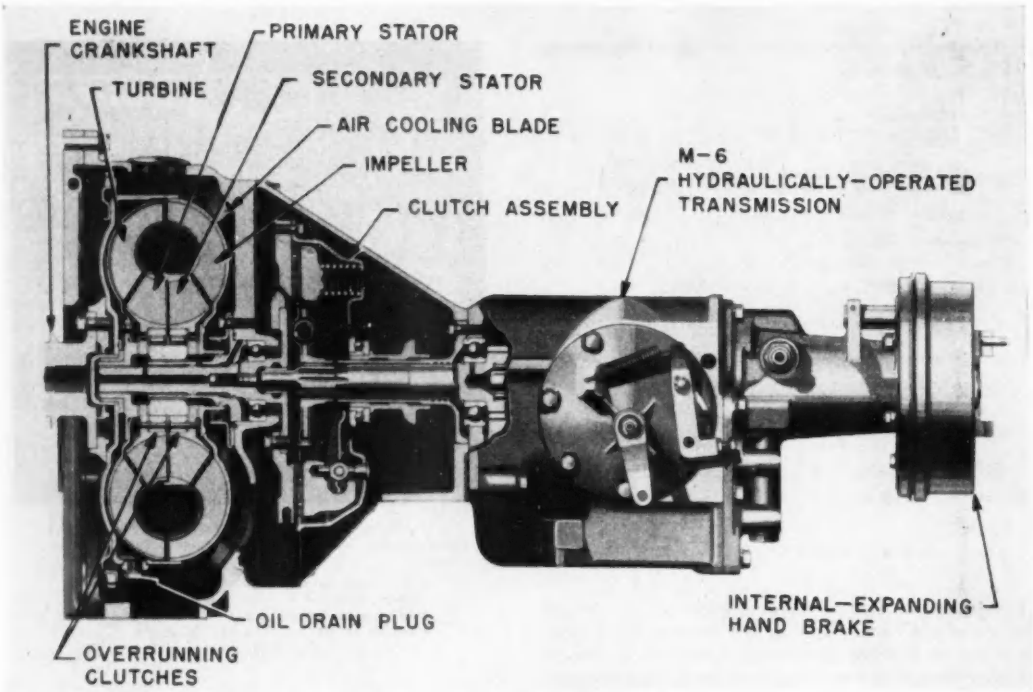
Fig. 7—The effect of length-diameter ratio l/d on the unit load p_m and total load carrying capacity P of a journal bearing.

Shaft length between support L = 15 in.
Journal diameter d = 2.250 in.
Bearing diameter D = 2.253 in.
Viscosity of oil $\mu = 7.1 \times 10^{-6}$ lb sec/in^2.
Journal speed N = 2000 rpm

Surface Finish

The curve showing the relation between unit load and l/d ratio similar to that frequently discussed in the literature, is plotted with dashed line in Fig. 7 and is a cross-plot of Fig. 5. Three values of h_r were chosen for these plots, i.e. $h_r = 0.25 \times 10^{-3}$; 0.375×10^{-3}; and 0.6×10^{-3} and may be considered as the sum of the height of asperities on the journal and bearing surface, or degree of surface finish. For each value of h_r, the corresponding ratio of l/d was obtained for each load in Fig. 5. The corresponding unit loads and total loads were calculated and plotted in Fig. 7. As an example assume the sum of the height of the asperities on the journal and bearing to be 0.25×10^{-3} in. and the load 4000 lb. The minimum film thickness at point of rupture would then be $h_r = 0.25 \times 10^{-3}$ in. At 4000 lb and $h_r = 0.25 \times 10^{-3}$ in., l/d = 0.5 and 2.3 (Fig. 5). The corresponding value of l with d = 2.25 in. will be 1.125 and 5.18 in. respectively and the bearing areas 2.54 in.^{2} and 11.6 in.^{2} With a total load of 4000 lb the unit load becomes 1570 lb/in.^{2} and 345 lb/in.^{2} which are plotted as the dashed curve (1), Fig. 7, at the above l/d ratios. The total load of 4000 lb is plotted at the same l/d ratios as indicated by the solid curve (1) of Fig. 7. It should be noted that each value of h_r presents a maximum value of unit load p_m and total load P, and these at different corresponding values of l/d. The value of l/d = 0.75 corresponding to maximum load carrying capacity is often cited in literature. This value for unit load

(*Turn to page 76, please*)



Simplified torque-drive assembly showing cross-section of new torque pressure at 20 psi, may be seen in the central hollow shaft.

Single Oil System for Engine and Torque Converter

Chrysler's Simplified Torque Converter Eliminates Separate Oil Pump and Sump

RECENT announcement by Chrysler Corp. of the simplified fluid-torque drive, reveals that the new drive incorporates a much simpler form of Chrysler torque converter, in combination with the familiar M-6 transmission. The new drive is offered as special equipment on all 1952 Chrysler Windsor models; and on DeSoto Fire Dome V-8 models. The torque converter originally developed for the Chrysler V-8 models, however, still remains unchanged at this writing.

Redesign of the basic torque converter was effected in conjunction with combining the oil system of the torque converter with that of the engine, thereby permitting elimination of the torque converter oil pump as well as the oil sump. The torque converter now is aircooled by high performance blades on the outside of the torque converter shell. Providing adequate cooling, this blading eliminates the need for a separate oil cooler.

Maximum torque multiplication of the simplified unit now is 2.5 to 1, a high value in this field, while a breakaway torque ratio of 4.02 to 1 is available for a start in the drive range.

With this drive 13 quarts of engine oil are used for the combined torque converter and engine system. Although this requires replacement of a larger volume of oil at an oil change, actually replacement has been reduced overall by changing the specified interval between oil changes to but twice yearly—

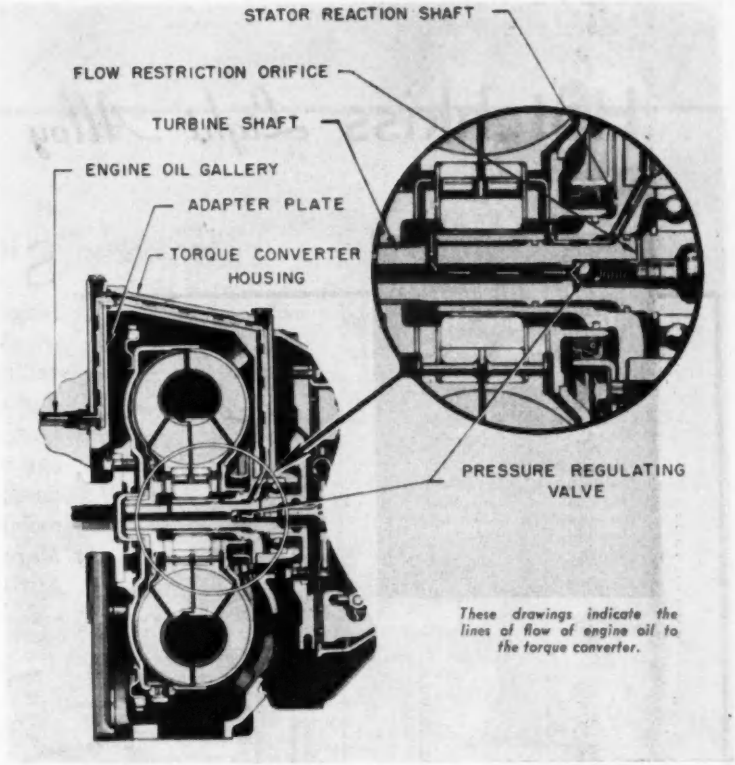
spring and fall — or seasonally depending upon climatic conditions. The oil filter element is replaced every 5000 miles. The fact that the engine can draw upon a larger volume of oil is thought to actually lengthen the useful life of engine oil.

As illustrated, the simplified torque converter consists of four basic elements—an impeller, a turbine, and two stators. Both impeller and turbine are hydrogen-brazed assemblies, while the stators are precision aluminum castings. Both torque converter housing and clutch housing are made of die-cast aluminum or magnesium.

An unusual feature of the torque converter assembly is the use of straight radial vanes for the impeller — responsible for the desired stall torque ratio and stall speed. Turbine and stator vanes, on the other hand, are curved for optimum efficiency. Each stator is mounted on an overrunning clutch, consisting of eight spring-loaded rollers mounted within an internal cam and around the periphery of the hub.

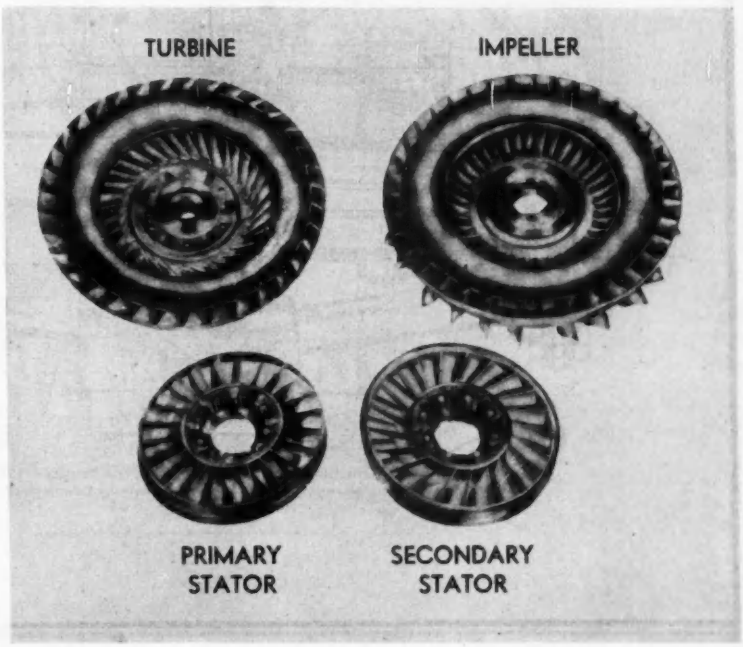
The aircooling vanes, mentioned previously, are mounted circumferentially around the outside of the impeller shell and are irregularly spaced to prevent noise.

Oil is supplied to the torque converter from the rear end of the engine oil gallery. A passage through the adapter (*Turn to p. 92, please*)



These drawings indicate the lines of flow of engine oil to the torque converter.

Chrysler torque converter disassembled to show major parts of simplified construction. The series of irregularly placed air-cooling vanes are seen below in this view of the impeller.

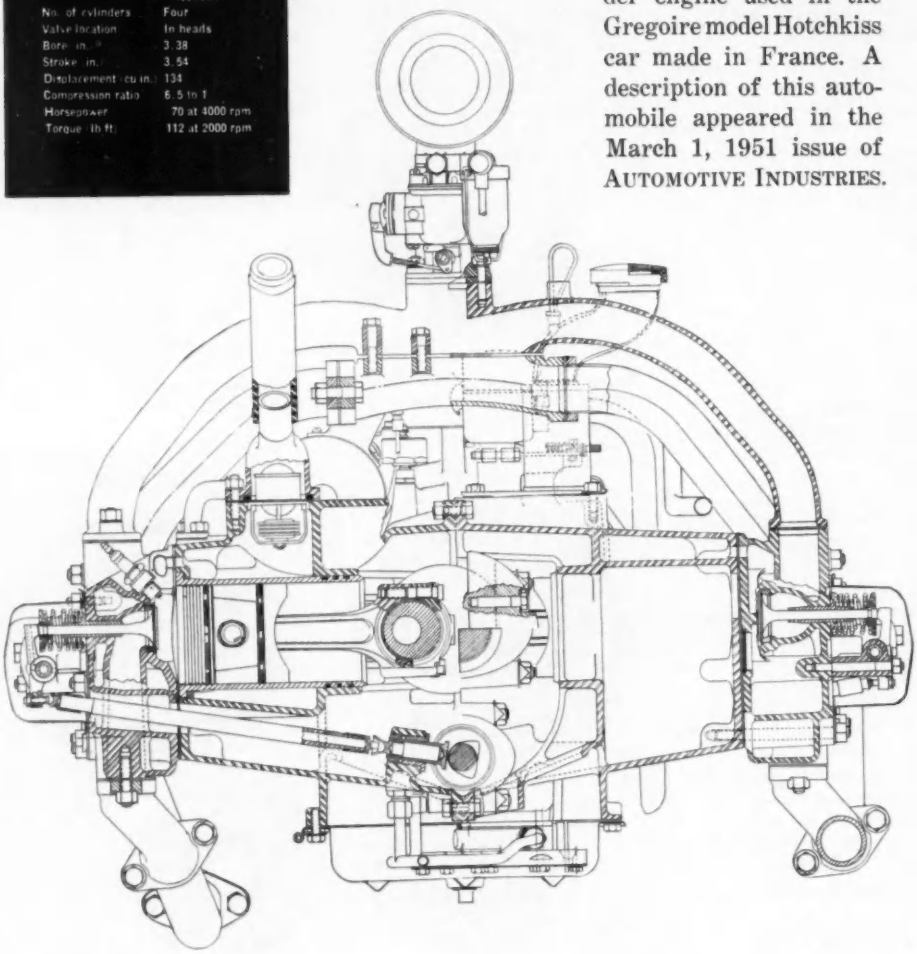


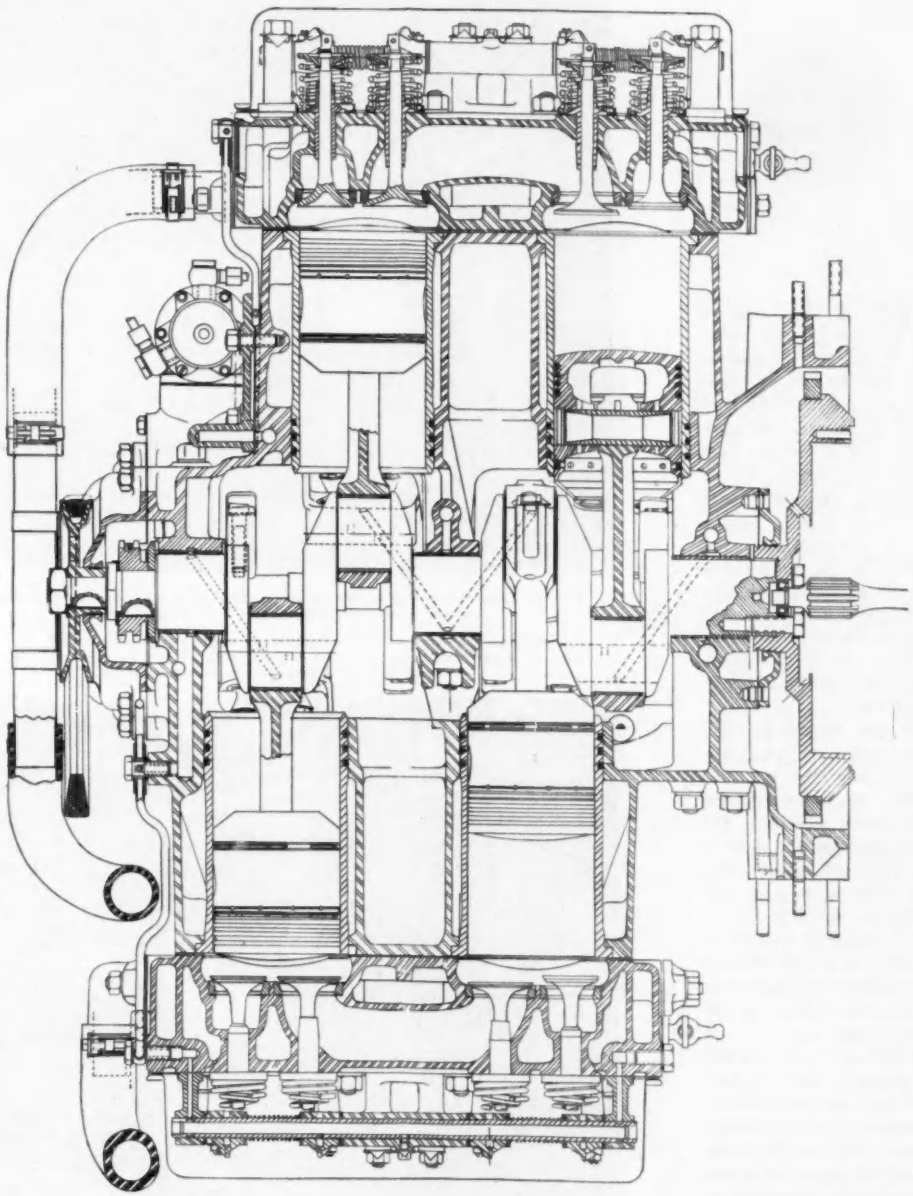
Hotchkiss *Light Alloy* Engine

Condensed Specifications
The Gregoire Model Light Alloy Engine

Type	Horizontal opposed
No. of cylinders	Four
Valve location	In heads
Bore, in.	3.38
Stroke, in.	3.54
Displacement, cu in.	134
Compression ratio	6.5 to 1
Horsepower	70 at 4000 rpm
Torque, lb ft.	112 at 2000 rpm

SHOWN here are both a transverse and a longitudinal view of the overhead-valve horizontal opposed, four cylinder engine used in the Gregoire model Hotchkiss car made in France. A description of this automobile appeared in the March 1, 1951 issue of AUTOMOTIVE INDUSTRIES.





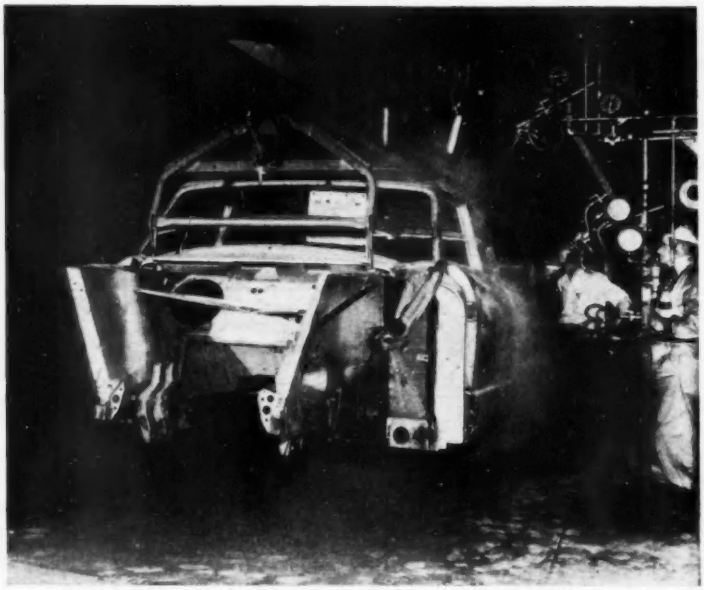
Special Welding Equipment

By Joseph Geschelin

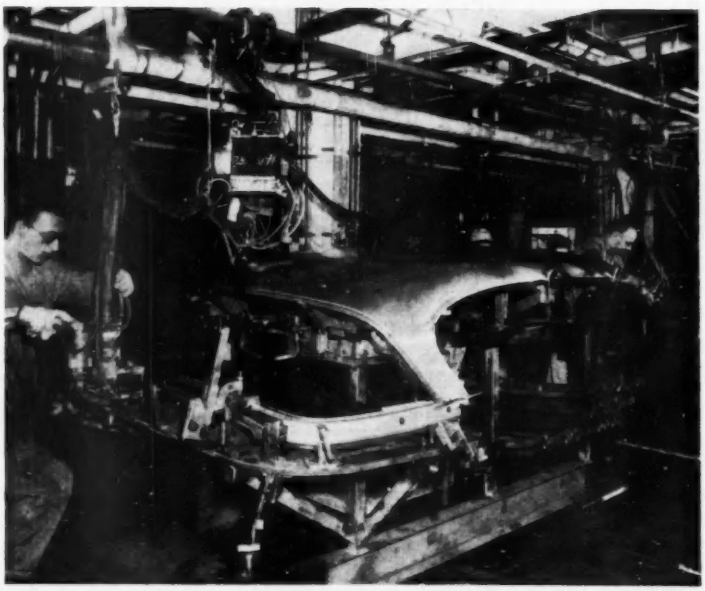
WITH the introduction of new bodies on its 1952 models, Nash Motors Div. of Nash-Kelvinator Corp. completed a major program of rearrangement of welding lines in the Nash Body Plant in Milwaukee, together with the introduction of considerable new welding equipment. It is noteworthy that all of the fixtures for body fabrication and all dies for the press shop are entirely new to accommodate the redesigned body stampings.

Uniside stampings and assemblies have been improved over the previous model, the assembly now being more adaptable for replacement in the field in the event of major collision damage to the car. Similarly, the rear fender now is designed to bolt on and also is spotwelded at the doorway and deck lines and is thus easier to replace in service.

A hidden feature of the new bodies is the standard procedure of spraying or brushing welding primer in many areas of the metal assemblies which are not exposed to the Bonderizing treatment after final assembly. This includes such areas the the Uniside chan-

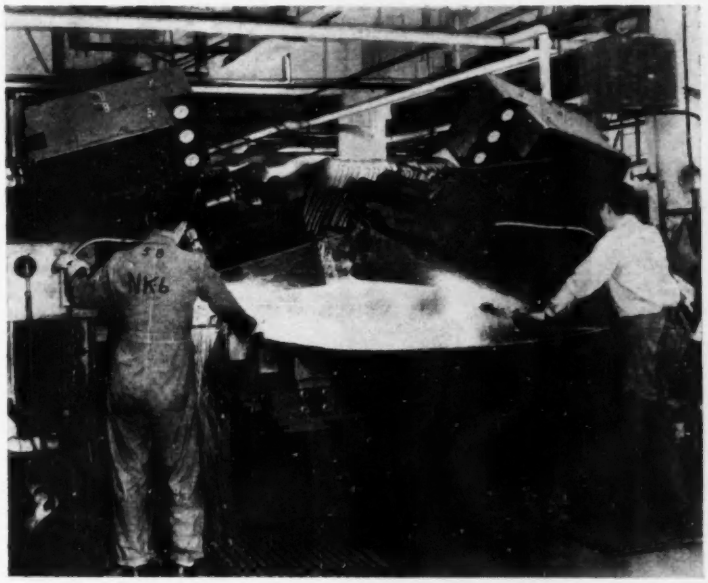


View in spray booth showing automatic spraying of primer on framed bodies. The operator is employed only to handle the main shut-off valve.



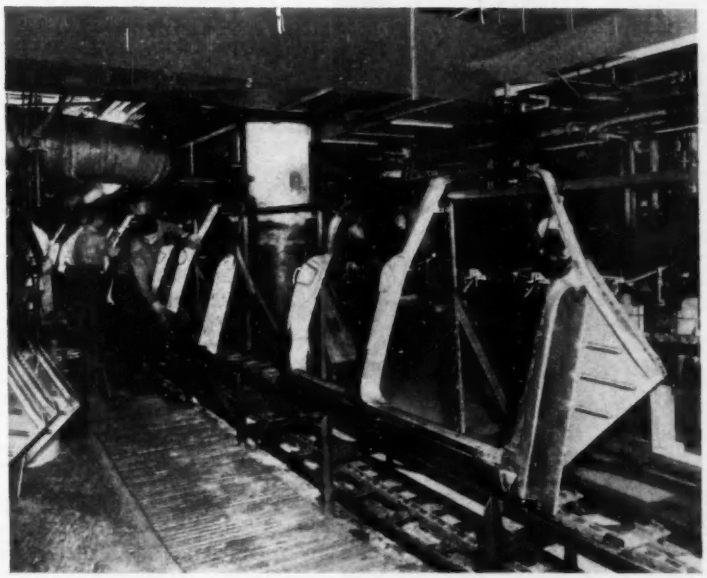
The roof assembly, seen here, is completed on a merry-go-round conveyor. It includes the roof panel, shelf panel assembly, and belt rails. It will be noted that the fixture serves to carry a store of parts used on this line.

Used at Nash Body Plant



This is the Thomson flash welder which is used for welding the slender roof extension stampings on the right and left ends.

Nash Unisides are inspected on this conveyor following welding on the merry-go-round. This affords an excellent view of the replaceable section suitable for installation in the field.



nels, rear wheelhouse, and other points that are covered after assembly. The welding primer does double duty; it facilitates welding and provides adequate corrosion resistance as well.

Among the latest developments at the Milwaukee Body Plant is the use of automatic paint spray equipment for applying the prime coat on bodies.

One of the features of the Nash body structure is the double wheelhouse construction at the front. The inner wheelhouse consists of an assembly of the metal panel, side sill extension, and the heavy gage fabricated front suspension bracket. In addition, the engine mount bracket also is welded onto this assembly. As in the case of other assembly operations in this plant, the inner wheelhouse sub-assembly is handled on a merry-go-round conveyor, as illustrated.

The roof panel is assembled on a merry-go-round conveyor, as illustrated. The welding fixture is loaded with the roof panel, the rear shelf, and belt rail, then welded securely after these parts have been clamped in place. An interesting feature of the welding fixture is the provision of ample space for carrying a considerable stock of the smaller stampings, thus making it unnecessary for the operator to reach for these parts when loading the fixture.

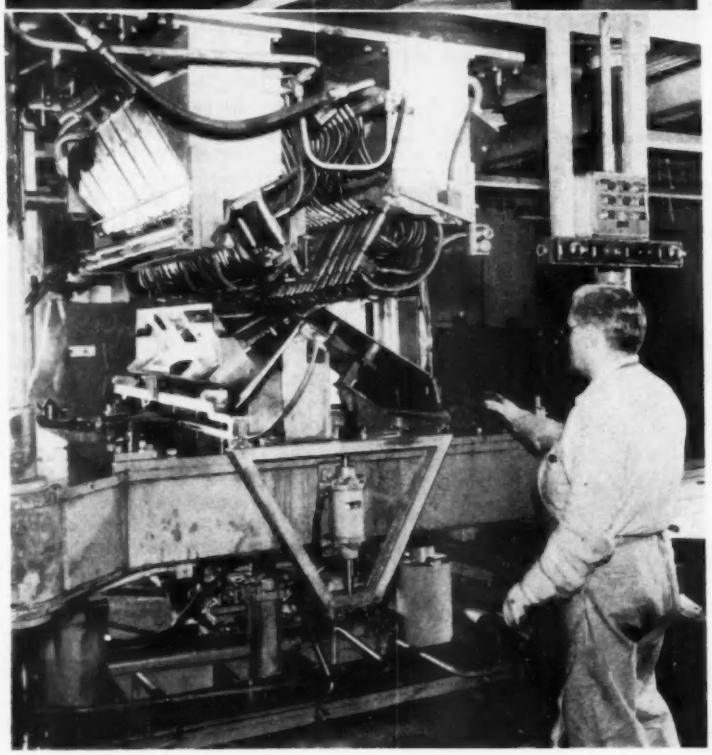
The underbody assem-

Among the examples of new welding equipment installed here is this Expert machine. It handles a series of 28 spot welds in joining the upper control arm housing to the outer wheelhouse panel.

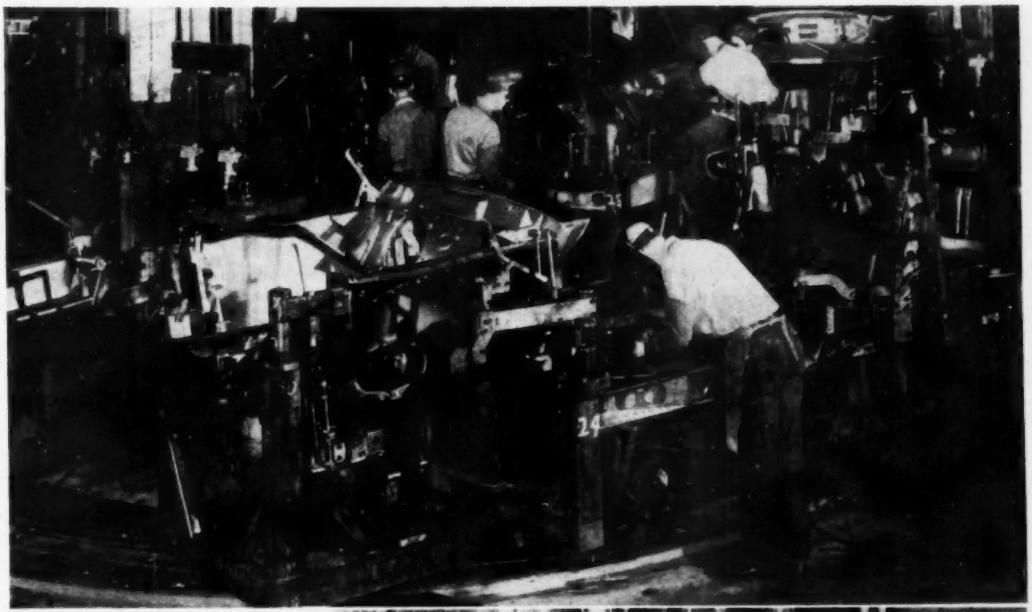
bly, complete with dash, toeboard, and inner and outer front wheelhouses, is prepared on merry-go-round assembly conveyors on the first floor. The completed subassembly is conveyed to the fifth floor by means of a special conveyor and fed to the body framing merry-go-round conveyors. The body shell is built up on the underbody as the backbone, adding rear wheelhouse panels, Unisides, the windshield opening panel, and finally the roof panel subassembly. The windshield panel and roof assembly is accurately aligned by means of a special fixture which is properly located by mounting over pilots on the main framing fixture.

Upon completion of operations on this main framing merry-go-round conveyor, the body shell is transported to a body truck on a floor type conveyor for final welding operations.

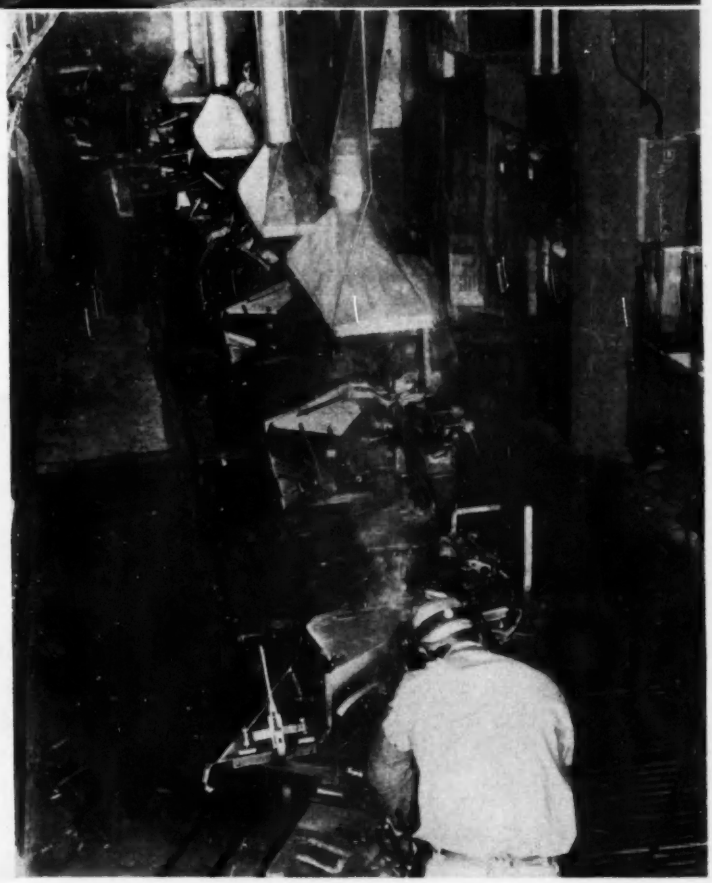
Nash has installed a considerable number of new, automatic multi-spotwelding machines built by Expert, Progressive, and Federal Welding Machine Companies, a few examples being illustrated here. One of the interesting pieces of equipment is the new Thomson flash welder. This



One of the multiple-spot Progressive welders recently installed in this plant. This one is tooled for making 60 spot welds in one setting on the toeboard and dash sub-assembly.



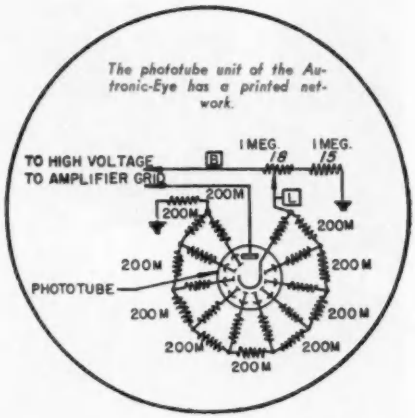
View of underbody assembly on the merry-go-round conveyor. Operations include assembly of the front wheelhouse panel, inner and outer side sill extension, dash and toeboard, seat riser, shock absorber housing, and lower deck center.



Heavy duty welding operations, including gun and arc welds, are performed on this basic sub-assembly of the front wheelhouse inner panel and side sill extension. It also includes the front suspension bracket and front and rear engine mounting brackets. As shown, the operations take place on a closed conveyor line. (See right)

flash welder at Nash reveals the method for special application of this type of equipment. In this case it is used for welding the roof quarter panel extension — a short slender stamping — on each side. An interesting touch of modernity is found in the use of guards at each welding station. They hide the pyrotechnics but make the equipment much safer to operate.

New Device for Testing Autronic-Eye



The phototube unit of the Autronic-Eye has a printed network.

Autronic Eye Tester, complete with carrying case.

IN keeping pace with the latest developments, the Sun Electric Corp., Chicago, with the cooperation of the Guide Lamp Division and Oldsmobile Division of General Motors Corp., has produced an instrument for testing and calibrating the Autronic-Eye. Known as the Autronic Eye Tester, this special instrument enables the mechanic to make the necessary adjustments in servicing the new automatic headlamp dimming device.

There are three adjustments which are essential to proper operation of the Autronic-Eye. These are aiming, dim sensitivity, and hold sensitivity. The tester, which uses the cigarette lighter socket as a power source, checks these adjustments and assures their correct setting. A selector switch adapts it to cars having either clear or tinted windshields. Oldsmobile and Cadillac dealers and United Motors Service branches are being equipped with this tester.

Aiming the Autronic-Eye. After the aiming device of the tester has been calibrated to match the unit number of the photo tube being aimed, if it is placed on top of the photo tube unit. Aiming is done by rotating an Allen head screw in the base of the photo tube unit until the bubble in the level of the aiming device is centered.

Adjusting dim sensitivity. Lens is removed and replaced by the test lamp of the instrument. Adustment is made by means of a special screw driver as shown. Proper setting is shown on a meter in the tester.

News of the MACHINERY INDUSTRIES

By Thomas Mac New

Machinery Expansion Goals Announced by DPA. Machine Tool Order Volume Up.

Machine Tool Expansion Goal

Interim expansion goals for machine tools and related equipment were disclosed recently by the Defense Production Authority. The figures are said to provide a basis for the DPA's Office of Construction and Resources Expansion to render Government assistance to achieve the needed expansion. The accompanying table points out the goals, and in each case they are stated in terms of dollar value of capital investment. Expansion cited in each case represents the increase over the capacity on July 1, 1950.

Product	Capital Investment in Added Production Capacity ($)	Completion Date
Machine Tools	125,000,000	1-1-54
Presses and Forging Equipment	28,000,000	1-1-54
Metal Cutting Tools	30,000,000	7-1-53
Dies, Jigs and Fixtures	33,000,000	1-1-54
Abrasive Products	34,000,000	7-1-53

Heavier Presses for Forging and Extrusion

On December 2, four national societies—ASME, AIME, IAS and the SAE—will hold a symposium in New York on forging presses and their use in aircraft production. Five papers will be presented at the meeting.

It has been felt that heavier forging presses will do much to improve airframe technology, and contracts have been let by the Government for the construction of 17 of the 20 heavy presses for which Congress has allocated funds. These presses are scheduled for completion in 1954 or sooner. In order to produce some of the columns for the larger presses, it is necessary to enlarge some of the largest furnaces in this country.

Government Selling Discussed at Sales Conference

Last month at Cornell University the NMTBA and American Machine Tool Distributors Association held their joint sales conference. One of the features of the meeting, which had the largest single class (140 students), since the inauguration of the event, was the lecture on selling to the Government. This subject also covered Government regulations as connected with machine tool selling. Although this lecture has been a regular sales conference topic, a great deal of emphasis was placed on it this year due to the defense program.

Gears Up

The AGMA index—1935-39 = 100—shows volume for the gearing industry to be increased by 6.0 per cent in June as compared with the previous month. The index for June is computed to be 452.3.

Casting Progress Outlined at Meeting

At the recent 12th annual convention of the Alloy Casting Institute in Hot Springs, Va., members were presented with a complete picture of the progress being made in the field of high alloy casting materials and techniques. A preliminary report on the evaluation of titanium as a substitute for columbian in the cast stainless steel alloys was given.

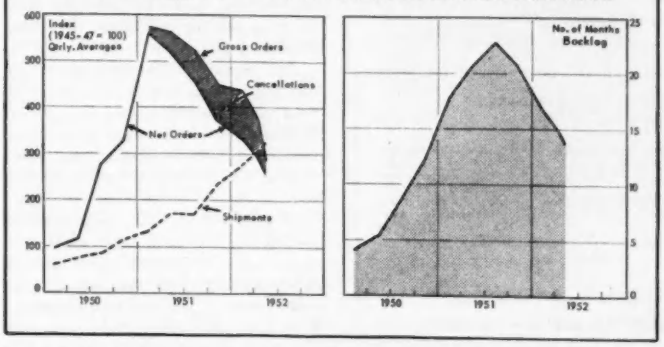
It was pointed out that research at Battelle Institute is concentrated on high temperature work, with the most effort being devoted to a study of the 20 per cent chromium, nine per cent nickel composition type for elevated temperature service.

Another high temperature program scheduled at Battelle includes a study of the correlation of thermal fatigue and stress rupture properties of the 35 per cent nickel, 15 per cent alloy composition range, it was reported.

New Orders On Increase

The machine tool industry reports that new orders have picked up and other orders previously cancelled have been reinstated. New orders in June totaled $104,000—the highest since December. The trend is said to be continuing. Machine sales would be even higher if the machine tool makers had obtained an earlier revision to Regulation M-41 to permit unrated order delivery. This would have diverted to American builders orders passed out to foreign sources. A proper regulation change also would have been a boon to automobile manufacturers attempting to obtain tooling for new engines.

Machine tool shipments exceed new orders for first time since Korea



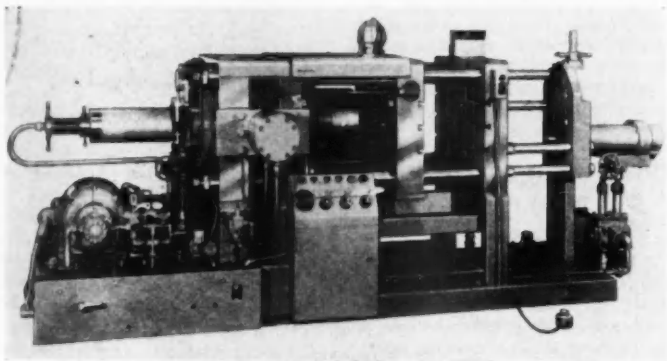
Source: Sixth Quarterly Report, July 1, 1952, to the President by the Director of Defense Mobilization.

NEW EQUIPMENT PLANT • PRODUCTION

FOR ADDITIONAL INFORMATION, please use postage-free reply card on PAGE 65

Cold Chamber Die-Casting Machine

A precision-built cold chamber die casting machine, known as Wedge-lock, can develop and hold 40,000-lb pressures without opening of die faces and flashing. Dies with cavities 7½ in. deep can be run with an opening up to 15 in. maximum. A shallow cavity can be run at a 10 in. opening for faster cycling and increased output.



Cuyahoga cold chamber die casting machine.

The die opening can be set at any point from 10 in. to 15 in. Motorized central screw adjustment regulating die height makes possible adjustments to 0.001 in.

Castings are said to be solid and non-porous, since the pump delivering oil to the shot cylinder has an adjustable relief valve permitting adjustments from 1000 to 2000 psi.

A central hydraulic ejector cylinder is used. Heavy duty construction is said to meet the most severe requirements. *Cuyahoga Industries.*

Circle E-1 on page 65 for more data

Chrome Carbides

Grade 608 chrome carbide is the first of the new Series 600 cemented chrome carbides to be made available. The new metal is composed of 83 per cent chrome carbide, two per cent tungsten carbide and 15 per cent nickel. Among its outstanding physical properties are its density, which is about half that of tungsten carbide, and its coefficient of thermal expansion, which approximates that of steel.

Chrome carbides are already available in limited quantities in a variety of shapes for engineering and metallurgical test applications. Eventually, the carbide will be available in approximately the same size and shape range in which tungsten carbide is now being offered. *Carboloy Dept., General Electric Co.*

Circle E-2 on page 65 for more data

PHYSICAL PROPERTIES OF CEMENTED CHROME CARBIDE (Grade 608)

Hardness	88 —Rockwell "A"	Abrasion Resistance	— Good — some less than tungsten but much better than hardened steels.
Density	— 7.0 gms/cm³ (slightly lighter than SAE-1095)	Resistance to Oxidation	— Only a slight surface discoloration after 24 hours in air at 1800° F.
Transverse Rupture Strength	— 100,000 PSI		
Compressive Strength	— Higher than most hardened steels.		
Coefficient of Thermal Expansion	— 6.4 x 10^{-6} in the range of 70°-1292° F.	Resistance to Corrosion	— Excellent
		Magnetic Permeability	— Non-magnetic

Self-Contained Coolers for Cutting Fluids

A series of compact and self-contained liquid chillers designed for various industrial applications has been placed on the market.

Readily installed as a complete package, these special refrigerating machines have been adopted for cooling cutting fluids on machine tools such as honing machines, broaching machines, etc.

This liquid chilling equipment also has been found useful in cooling the fluid for resistance welding tools; cooling tanks and solutions for electroplating and anodizing; and mold cooling to increase overall productivity.

In addition to this refrigerating equipment, the company also produces a line of Dry-Ex water chillers of cylindrical form for use as heat exchangers in industrial processing. *Flow Cold Div., Acme Industries, Inc.*

Circle E-3 on page 65 for more data

High-Speed Machines for Chamfering Zerol Gears

Burr-Master Model BM-2055, the first in a line of machines for chamfering zerol bevel gear teeth is now available to the trade. The machine is said to deburr and chamfer tooth edges at both heel and toe of an eight in. diam, 99 tooth, 12.53 pitch aircraft zerol bevel reduction gear in 30 sec cutting time.

Work is brought into the cutting position by a pneumatic cylinder, and the teeth are then chamfered by rotating the work in timed relation to the cutting action of four dovetail-type high-speed steel form tools. When the cutting cycle is completed, the work is lowered into unloading position automatically.

Four form tools are provided to chamfer the entire tooth contour at both heel and toe ends. These tools are actuated by a combination rocker arm motion that gives a generated cutting action which enables the form tools to chamfer and deburr the tooth edges well around the root of the gear tooth.

The zerol bevel gear is located in the fixture by a pilot. Three spring loaded locators spaced at 120 deg on the outside of the fixture are provided for radial location. A part is located radially in the fixture by depressing any of the locators into a tooth space.

Clamping of the work in the fixture is accomplished by sliding a C-washer over a draw bar and turning a handwheel under the fixture. Work is unclamped by loosening the handwheel and sliding off the C-washer.

Modern high-speed gear chamfering machine, Model BM-2055.

The Model BM-2055 Burr-Master has a floor space 28 in. by 40 in. and is 70 in. high overall. It weighs 2200 lb and is powered by a 1200 rpm, one hp motor. *Modern Industrial Engineering Co.*

Circle E-4 on page 65 for more data

Instrument for Color Measurement

Development has been announced of the Colormaster Differential Colorimeter, an instrument for obtaining accurate color measurements of synthetic fibers, paints, liquid solutions, pigments, slurries—any substance, in fact, where color is an important factor.

A complete set of color measurements according to the maker can be made with the Colormaster in less than 30 sec. The instrument is particularly useful for measuring differences between similar colors for process control applications.

Three color filters give approximations to the I.C.I. X, Y, and Z functions, and transmissions and reflections are measured directly. The linearity of the instrument is within approximately 0.2 per cent reflectance or transmission down to 10 per cent; by standardizing on a known dark panel, the range can be extended below 10 per cent, with linearity within approximately 0.02 per cent. The dial can be read to 0.1 per cent, and hundredths of a per cent can be readily estimated. The dead zone (back-lash) does not exceed 0.02 per cent reflectance or transmission.

Manufacturers Engineering, Colormaster Differential Colorimeter.

Magnetic shielding is included to permit measurement of colors where steel panels may be used. The electrometer input impedance is about 6,000 megohms. Two calibrated, highly stable white panels are furnished with the instrument. Standard dark panels are available as accessories. *Manufacturers Engineering & Equipment Corp.*

Circle E-5 on page 65 for more data

(*Turn to page* 58, *please*)

NEW EQUIPMENT PLANT • PRODUCTION

For additional information, please use postage-free reply card on page 65

(*Continued from page 57*)

Portable Core Grinder

Recently announced is the addition of a Model 18 portable foundry core grinder to a standard line of core grinders. This machine is said to handle a large range of core sizes and produces uniformly flat faces without broken edges.

Model 18 core grinder employs an 18-in. diam grinding wheel mounted on an adjustable head which locks firmly in any position. Maximum clearance between the table and the face of the grinding wheel is 18 in., and maximum working capacity is 15 by 24-in. core surface. To speed production, small cores can be mounted in multiples in gang fixtures. Machine can handle cores of one size in production quantity, or it can be adapted quickly for short runs on cores of various sizes.

The Model 18 core grinder requires three by five ft floor space for operation and 30 by 42 in. space for storage. It is supplied complete with a one hp, 220/440 v, fully enclosed motor which drives grinding wheel at 660 rpm. *Milwaukee Foundry Equipment Div., SPO, Inc.*

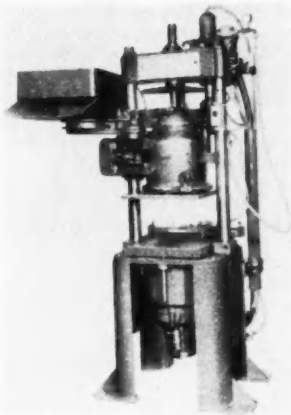
SPO portable foundry core grinder, Model 18.

Circle E-6 on page 65 for more data

Core Blowing Machine Uses Wooden Core Boxes

A core blowing machine that is said to be capable of blowing cores in unvented, unrigged wooden core boxes has been placed on the market. Called the Pulsator San-Blo, this machine makes use of wooden boxes used by bench core makers for ramming by hand.

Cores can be blown with two, three or four short, quick blows, instead of filling the core box cavity with one continuous blow. Air pressure within the core box is kept low during the blowing cycle. An arrangement of air valves and switches automatically controls the blowing cycle, starting and stopping the blowing action to maintain pressure within the core box close to atmospheric pressure at all times.



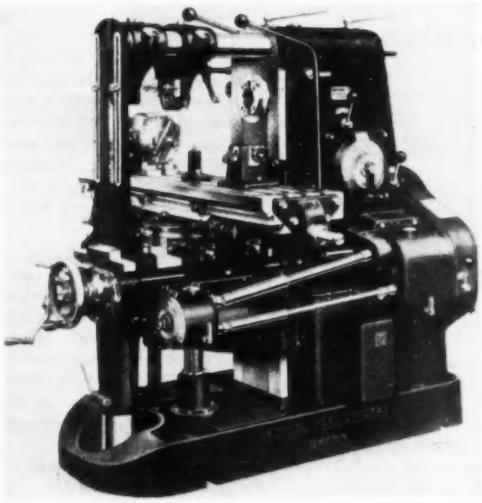
Federal core blowing machine, Pulsator San-Blo.

The Pulsator San-Blo also features a mechanized sand magazine, using motor-driven plows and an "aerating" air circuit to move sand to the blow hole and carry it into the core box. A sand mixture with moisture content up to 8 per cent and green bond strength up to 12 psi can be used. It is claimed to blow cores weighing from a few ounces to 40 lb each, with one standard sand magazine. *Federal Foundry Supply Co.*

Circle E-7 on page 65 for more data

(*Turn to page 60, please*)

Horizontal and Vertical Milling Machines



A line of Swedish milling machines has been announced that is available in both horizontal and vertical types. Manufactured by the Koping Co., the milling machine can be used for both toolrooms and production work. (American Pullmax Co., Inc.)

Circle E-8 on page 65 for more data

Its scientifically designed, raised-lug pattern provides positive traction from every direction.
Can be sheared, welded, punched, flame cut, shaped!
It won't absorb liquids—there are no pores or cracks! Easy to sweep, too.
Wherever safe footing is important, American industry specifies
It comes in a wide variety of patterns and sizes!
Made of steel, it will stand up for years under tough abuse!
Its pattern is easy to match from any direction.
It's strong and will carry heavy loads.

INLAND 4-WAY SAFETY PLATE

- on your products
- for maintenance and repair
- in new construction

Write for Bulletin F-1

INLAND

INLAND STEEL COMPANY • 38 South Dearborn Street, Chicago 3, Illinois

Sales Offices: Chicago, Davenport, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul

STOCKED BY LEADING STEEL WAREHOUSES

NEW EQUIPMENT PLANT • PRODUCTION

For additional information, please use postage-free reply card on page 65

(Continued from page 58)

Metal Forming Bulldozer

Recently put out on the market is a metal forming press (bulldozer) that provides vertical hold-down cylinders which secure the pressure plate upon the die during forming. The cylinders instantly release upon completion of the operation, allowing fast removal of the work and reloading for another cycle.

To effect the vertical clamping, two 25-ton cylinders are mounted on a rolling assembly which may be positioned anywhere along the bulldozer bed. Each cylinder is independently controlled by a four-way selector valve. Pressure may also be varied by reducing valves. These controls are integral with the over-head assembly and mounted on a convenient panel.

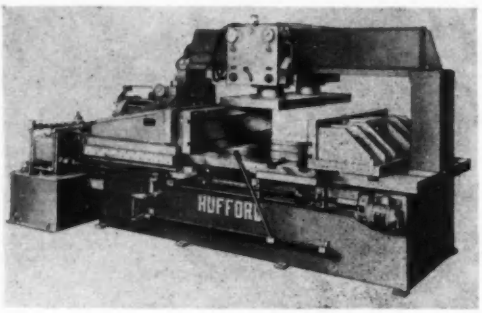
For conventional bulldozing when vertical die pressure cylinders are not required, vertical space is increased by unbolting and removing the overhead track and clamping unit.

Sensitive control is provided by a threaded lead-screw type shipper rod along the side of the bed. This is rotated by a reversible motor drive. A stop, threaded upon this screw, may be shifted back and forth by electrical push button controls.

Also attached to the shipper rod is a handwheel by which fine adjustments may be made. One rotation of the handwheel equals 0.125 in. of ram travel. The hand lever on the machine front controls rate of ram travel, start and stop.

Although other work capacities and tonnages are available, the Model 88 bulldozer illustrated is rated at 150 tons. Adjustable platens provide 24 in. to 60 in. of daylight. Platen dimensions are 16 in. by 60 in. The overhead clamping unit provides from eight in. to 18 in. of daylight and platen measures 24 in. by 60 in. Pressing speed of main ram is variable, zero to 70 ipm. Retracting—zero to 9 ipm. Main ram stroke—24 in.. *Hufford Machine Works, Inc.*

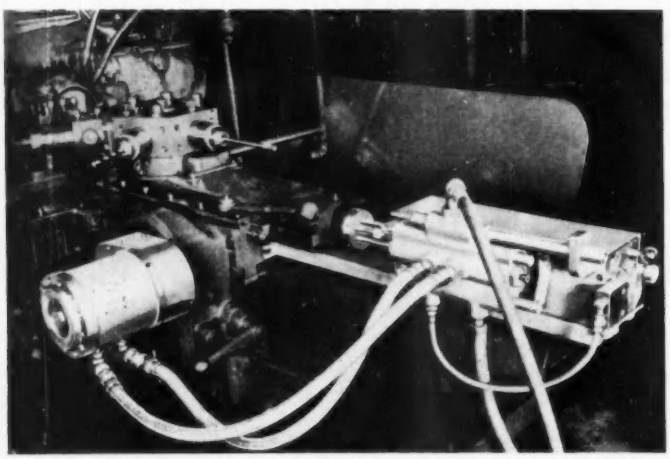
Circle E-9 on page 65 for more data



Hufford metal forming bulldozer, Model 88.

Hydraulic Drive for Ram-Type Turret Lathes

A hydraulic drive for powering ram-type hand turret lathes has been announced. The attachment is designed for turret lathes with six station turrets and is adaptable to lathes with bar stock capacity up to 2½ in.



Viking hydraulic turret drive.

The complete unit consists of a ¾-hp motor, two pumps, reservoir, fluid motor, control valves, and connections. Pumps, motor, and reservoir fit under the end of the machine. The fluid motor attaches to the turret pilot-wheel shaft and the control body mounts on the end of the turret.

Automatic individual cycles and feed rates can be set to suit different operations in up to six turret positions. Individual circuit control rods and adjustable dogs provide the means for controlling the rate and length of feed. Cycles for each of the six positions can be set for rapid approach, dwell, infinite adjustable feed, and quick return. *Viking Industries.*

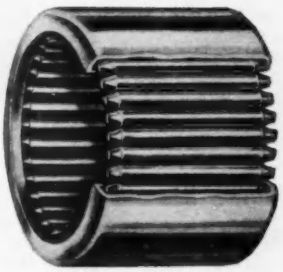
Circle E-10 on page 65 for more data

(Turn to page 62, please)

for long, dependable service...

Torrington Needle Bearings have set outstanding service records in countless applications throughout industry. The reason is simple. Needle Bearings are made to last. The one-piece shell which serves as the outer raceway is accurately drawn from carefully selected strip steel. After forming, it is carburized and hardened, with no further grinding that might destroy the wear-resistant raceway surfaces. The precision-ground rollers are thru-hardened for long life.

Because of this careful selection of materials and precision workmanship to close tolerances, Torrington Needle Bearings provide accurate, dependable performance in the most rugged applications. Ask our engineering department to help you determine how you can use Needle Bearings to advantage in *your* product.



THE TORRINGTON COMPANY
Torrington, Conn. South Bend 21, Ind.
District Offices and Distributors in Principal Cities of United States and Canada

TORRINGTON *NEEDLE* **BEARINGS**

Needle • Spherical Roller • Tapered Roller • Straight Roller • Ball • Needle Rollers

NEW EQUIPMENT PLANT • PRODUCTION

For additional information, please use postage-free reply card on page 65

(*Continued from page 60*)

Stretch-Flattening Machine

It has been announced recently that a stretch-flattening machine has been developed. It can process in volume integrally stiffened extruded sections with flatness tolerances well within the precision requirements of present-day aircraft design, according to the maker.

Aluminum alloy integrally stiffened extruded tubular sections are first split longitudinally, roughly flattened, then heat treated.

In flattening, the heat treated integrally stiffened sections are end-mounted between mechanical vee-clamps in the tension flattening machine. One of the vee-clamps remains fixed while the other is mounted on a hydraulic piston. Using hydraulic pressure, the entire sheet is then placed under tension to a point just below the yield strength of the material.

After this initial tensioning, the traveling carriage with its three rigidly mounted displacement rolls is started along the sheet from the stationary jaw end. The movable chuck automatically takes up the slack of elongation and maintains even tension. The lower rolls of the carriage are sectional in design so that the tops of the extruded stiffeners rest firmly against an inner roll, while the outer rolls press firmly against the sheet area between the stiffeners. The upper roll is solid and smooth, and presses against what will be the external side of the flattened section.

As the traveling carriage progresses along the sheet, the material feeds over the first lower roll, then angles slightly downward under the upper center roll. Beyond the upper center roll, it angles upward again, then reverts to the plane of tension between the end clamping jaws after leaving the last displacement roll. *Longren Aircraft Co.*

Circle E-11 on page 65 for more data

Longren stretch flattening machine.

Hollow Bar Graphitic Steel

A graphitic steel product which will carry the trade name Graph-Mo Hollow-Bar has been brought out. This product is a turned and bored bar section using for the basic material Graph-Mo tool steel.

The product has the advantages of graphitic-type tool steel plus the convenience of the hollow bar section in manufacturing ring gages, dies and other annular tool steel parts.

Stock sizes will range from about four in. to 16 in. outside diameter with a variety of wall thicknesses. *Timken Roller Bearing Co.*

Circle E-12 on page 65 for more data

Sealed Ball Bearings

Sealed ball bearings, exclusively designed to keep dirt out—and lubricant in—and that are interchangeable with conventional non-sealed bearings, have been brought out. Known as Red Seal bearings, the seal is made of du Pont Fairprene.

An exclusive design, providing effective sealing—with extremely light contact and low friction—extends the seal below the steel retaining ring, forming a flexible lip which lightly touches a uniform chamfer of the inner ring.

Retaining rings have circular-formed ribs, and are staked securely during manufacture. The bearings are delivered factory-lubricated. *SKF Industries, Inc.*

Circle E-13 on page 65 for more data

Where lights must be kept burning, specify SILASTIC* lead wire

In the chemical industry where lights, essential to the safety of working men, burn 24 hours a day; along the runways of airports; in railway yards and control towers; along the docks and in beacon lights off-shore; Silastic-covered lead wire can assure continuous, trouble-free operation, and pay for itself in reduced maintenance and replacement costs alone. ¶ In the huge Midland plant of The Dow Chemical Company, for example, all lighting circuits are carried in conduit that doubles as supports and hangers for more than 50,000 lighting fixtures. Many of these are vapor-proof or explosion-proof fixtures where heat is a more serious problem. Over half of these fixtures burn constantly. Most of them are exposed to outdoor weathering. ¶ Under those conditions, maintenance and replacement were such a costly problem that engineers in the Electrical Department tried, and now specify, lead wire insulated with Silastic. This Dow Corning silicone rubber is the only kind of rubbery insulating material that retains good dielectric properties and will not crack or become brittle after long and continuous exposure to outdoor weathering at temperatures from —70° to +350° F. ¶ Silastic is also used as a gasketing and sealing material in hundreds of aircraft and automotive applications, at temperatures ranging from —100° to more than +500° F. It is unique among electrical insulating materials for Class B and Class H lead wire, for ignition and Navy control cable, and for transformers and field coils in traction motors.

Put Silastic to work for you; mail this coupon to:

Dow Corning Corporation, Dept. C-20
Midland, Mich.
Please send me:

- ☐ Silastic Facts 10a with new data on properties and applications of all Silastic stocks and pastes.
- ☐ "What's A Silicone?", your new 32-page booklet on silicone products and applications.

Name_____
Title_____
Company_____
Address_____
City_____ Zone____ State_____

*T.M. Reg. U.S. Pat. Off.

DOW CORNING SILICONES

DOW CORNING CORPORATION
Midland Michigan

Atlanta · Chicago · Cleveland · Dallas · New York · Los Angeles · Washington, D. C.
In Canada: Fiberglas Canada Ltd., Toronto
In England: Midland Silicones Ltd., London

NEW EQUIPMENT PLANT · PRODUCTION

For additional information, please use postage-free reply card on page 65

(*Continued from page 60*)

Stretch-Flattening Machine

It has been announced recently that a stretch-flattening machine has been developed. It can process in volume integrally stiffened extruded sections with flatness tolerances well within the precision requirements of present-day aircraft design, according to the maker.

Aluminum alloy integrally stiffened extruded tubular sections are first split longitudinally, roughly flattened, then heat treated.

In flattening, the heat treated integrally stiffened sections are end-mounted between mechanical vee-clamps in the tension flattening machine. One of the vee-clamps remains fixed while the other is mounted on a hydraulic piston. Using hydraulic pressure, the entire sheet is then placed under tension to a point just below the yield strength of the material.

After this initial tensioning, the traveling carriage with its three rigidly mounted displacement rolls is started along the sheet from the stationary jaw end. The movable chuck automatically takes up the slack of elongation and maintains even tension. The lower rolls of the carriage are sectional in design so that the tops of the extruded stiffeners rest firmly against an inner roll, while the outer rolls press firmly against the sheet area between the stiffeners. The upper roll is solid and smooth, and presses against what will be the external side of the flattened section.

As the traveling carriage progresses along the sheet, the material feeds over the first lower roll, then angles slightly downward under the upper center roll. Beyond the upper center roll, it angles upward again, then reverts to the plane of tension between the end clamping jaws after leaving the last displacement roll. *Longren Aircraft Co.*

Circle E-11 on page 65 for more data

Longren stretch flattening machine.

Hollow Bar Graphitic Steel

A graphitic steel product which will carry the trade name Graph-Mo Hollow-Bar has been brought out. This product is a turned and bored bar section using for the basic material Graph-Mo tool steel.

The product has the advantages of graphitic-type tool steel plus the convenience of the hollow bar section in manufacturing ring gages, dies and other annular tool steel parts.

Stock sizes will range from about four in. to 16 in. outside diameter with a variety of wall thicknesses. *Timken Roller Bearing Co.*

Circle E-12 on page 65 for more data

Sealed Ball Bearings

Sealed ball bearings, exclusively designed to keep dirt out—and lubricant in—and that are interchangeable with conventional non-sealed bearings, have been brought out. Known as Red Seal bearings, the seal is made of du Pont Fairprene.

An exclusive design, providing effective sealing—with extremely light contact and low friction—extends the seal below the steel retaining ring, forming a flexible lip which lightly touches a uniform chamfer of the inner ring.

Retaining rings have circular-formed ribs, and are staked securely during manufacture. The bearings are delivered factory-lubricated. *SKF Industries, Inc.*

Circle E-13 on page 65 for more data

Where lights must be kept burning, specify SILASTIC* lead wire

In the chemical industry where lights, essential to the safety of working men, burn 24 hours a day; along the runways of airports; in railway yards and control towers; along the docks and in beacon lights off-shore; Silastic-covered lead wire can assure continuous, trouble-free operation, and pay for itself in reduced maintenance and replacement costs alone. ¶ In the huge Midland plant of The Dow Chemical Company, for example, all lighting circuits are carried in conduit that doubles as supports and hangers for more than 50,000 lighting fixtures. Many of these are vapor-proof or explosion-proof fixtures where heat is a more serious problem. Over half of these fixtures burn constantly. Most of them are exposed to outdoor weathering. ¶ Under those conditions, maintenance and replacement were such a costly problem that engineers in the Electrical Department tried, and now specify, lead wire insulated with Silastic. This Dow Corning silicone rubber is the only kind of rubbery insulating material that retains good dielectric properties and will not crack or become brittle after long and continuous exposure to outdoor weathering at temperatures from —70° to +350° F. ¶ Silastic is also used as a gasketing and sealing material in hundreds of aircraft and automotive applications, at temperatures ranging from —100° to more than +500° F. It is unique among electrical insulating materials for Class B and Class H lead wire, for ignition and Navy control cable, and for transformers and field coils in traction motors.

Put Silastic to work for you; mail this coupon to:

Dow Corning Corporation, Dept. C-20
Midland, Mich.
Please send me:
- ☐ Silastic Facts 10a with new data on properties and applications of all Silastic stocks and pastes.
- ☐ "What's A Silicone?", your new 32-page booklet on silicone products and applications.

Name_____
Title_____
Company_____
Address_____
City_____ Zone____ State_____

*T.M. Reg. U.S. Pat. Off.

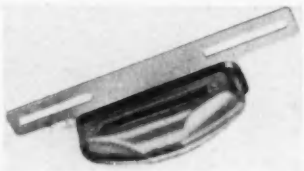
DOW CORNING SILICONES

DOW CORNING CORPORATION
Midland Michigan

Atlanta • Chicago • Cleveland • Dallas • New York • Los Angeles • Washington, D. C.
In Canada: Fiberglas Canada Ltd., Toronto
In England: Midland Silicones Ltd., London

NEW PRODUCTS

FOR ADDITIONAL INFORMATION, please use postage-free reply card on PAGE 65

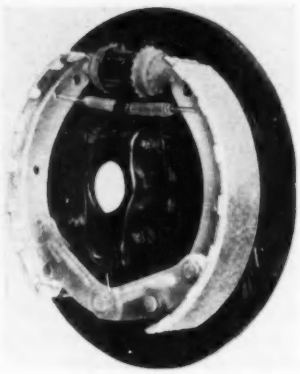


Two-Way License Plate Lamp

A chromed license plate lamp that mounts in either of two ways has just been put on the market. Complete with rubber pad and sheet metal screws it is ready for flush mounting or it can be mounted directly on the present license bracket.

This brass chrome plate license lamp has been released to meet the demands of motorists who wish to complay with state laws making compulsory the ilumination of rear license plates. *Yankee Metal Products Corp.*

Circle P-1 on page 65 for more data



Factory-Bonded Replacement Brake Lining

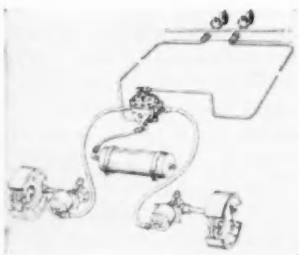
A method of relining brakes has been developed that consists of a brake lining bonded at the factory to a metal backing plate. The bonded unit can be attached to most automotive brake shoes. It is possible, according to the maker, to install these bonded brake linings, called Lock-On, with ordinary tools to brake shoes which originally were bonded or riveted. The metal backing plate has integral tabs for attachment to shoe. These tabs are bent over the shoe to secure the assembly.

The manufacturer also offers a crimping tool for bending the tabs of the metal backing plate over the brake shoe.

According to the maker, the Lock-On unit eliminates brake squeal and chatter. The units are also claimed to prevent fading. This is said to be due to the air cushion between the lining and the brake shoe.

Average time for the attachment of the lining to a brake shoe is 10 min, according to the maker. *Lock-On Brake Lining Corp.*

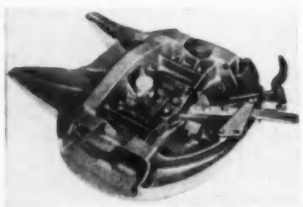
Circle P-2 on page 65 for more data



Quick Release and Emergency Valve for Trailers

Development of a combination relay quick release valve and emergency valve for use on trailers has been announced. The valve, part number AF-14331, is a combination unit performing three functions. As a relay unit, it acts in unison with the driver-controlled tractor application valve, automatically metering air from the trailer reservoir to speed trailer brake application. As a quick-release unit, its action speeds trailer brake release. And as an emergency unit it automatically applies the trailer brakes if there is an abnormal drop in the air pressure maintained in the trailer emergency line, such as would occur in the event of tractor-trailer breakaway. *Wagner Electric Corp.*

Circle P-3 on page 65 for more data



34-In. Cast Steel Trailer Coupler

A 34-in. cast steel coupler introducing many advanced points of design has been announced. Among the new features of this coupler are the use of closely machined parts on all bearing surfaces. All working parts are precision manufactured and held within tolerances of plus or minus 0.005 in.

The coupler has an entirely new lock release with a one-hand lock and unlocking operating device connected with the release handle. The lock is a positive spring-loaded case hardened steel block, and the assembly is contained in a housing packed with grease. *Fruehauf Trailer Co.*

Circle P-4 on page 65 for more data

Free INFORMATION SERVICE

Postage-Free Postcards Are Provided Here for Your Convenience to Obtain FREE LITERATURE and Additional Information on NEW PRODUCTION AND PLANT EQUIPMENT, AND NEW PRODUCTS Described in This Issue of AUTOMOTIVE INDUSTRIES. Please Circle Code Numbers of Items in Which You Are Interested, Print Name, etc., and Mail Promptly for Quicker Service.

USE THIS POSTCARD

FREE LITERATURE

Mechanical Development Apparatus

Brochure MDA-200 describes the complete line of precision components for assembly of control systems instruments, and analog computers for breadboard and semi-permanent assembly. In addition, it features an expanded line of new mechanical development apparatus components. *Servomechanisms, Inc.*

Circle L-1 on postcard for free copy

Strip Chart Program Controllers

Bulletin 1501 describes ElectroniK strip chart program controllers with electric set point index drive, used for automatic regulation of time-temperature control programs in metal processing. *Minneapolis-Honeywell Regulator Co., Brown Instruments Div.*

Circle L-2 on postcard for free copy

Plastic Coating for Spray Booths

A leaflet is being distributed which describes the use and application of Vincote, a new vinyl-type coating for paint spray booths. *Detrex Corp.*

Circle L-3 on postcard for free copy

Diamonds

Useful hints on the care and use of diamonds in grinding wheel dressers are contained in a recently published booklet. *Standard Diamond Tool Corp.*

Circle L-4 on postcard for free copy

Gaging

A brochure has been printed that fully discusses gage blocks and their use. Specifically, it describes and illustrates the Micro-Step gaging system and the components that provide over 1 million possible gaging setups. *DoAll Co.*

Circle L-5 on postcard for free copy

Double-Crank Presses

Straight-side, double-crank presses are described and pictured in a 20-page catalog, 17-D. Identified as S-2 presses, complete detailed specifications and dimensions are given as well as illustrations of presses ranging in capacity from 50 to 2000 tons. *E. W. Bliss Co.*

Circle L-6 on postcard for free copy.

Mill Products of Aluminum

Literature has been released dealing with aluminum mill products. It outlines the advantages of the wrought aluminum alloys, and contains an alloy selection guide as well as informative material on fabricating and finishing. *Reynolds Metals Co.*

Circle L-7 on postcard for free copy.

Lift Trucks

Bulletin 1570 describes Diesel and gasoline powered "FT" series fork lift trucks that are available in capacities from 3000 to 7500 lb. *Buda Co.*

Circle L-8 on postcard for free copy.

(*Please turn page*)

THIS POSTCARD VOID AFTER OCT. 15, 1952

Please send me additional free information on the items described in this issue of AUTOMOTIVE INDUSTRIES, the code numbers of which I have circled below: 9/15/52

FREE LITERATURE				NEW PRODUCTION & PLANT EQUIPMENT				NEW PRODUCTS			
L-1	L-7	L-13	L-19	E-1	E-7	E-13	E-19	P-1	P-7	P-13	P-19	P-25
L-2	L-8	L-14	L-20	E-2	E-8	E-14	E-20	P-2	P-8	P-14	P-20	P-26
L-3	L-9	L-15	L-21	E-3	E-9	E-15	E-21	P-3	P-9	P-15	P-21	P-27
L-4	L-10	L-16	L-22	E-4	E-10	E-16	E-22	P-4	P-10	P-16	P-22	P-28
L-5	L-11	L-17	L-23	E-5	E-11	E-17	E-23	P-5	P-11	P-17	P-23	P-29
L-6	L-12	L-18	L-24	E-6	E-12	E-18	E-24	P-6	P-12	P-18	P-24	P-30

Your Name .....Your Title .....

Your Company or Business .....

Address ..... (No. & Street) (City) (Zone) (State)

FIRST CLASS Permit No. 10 (Sec. 34.9 P.L.&R.) Philadelphia, Pa.

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

POSTAGE WILL BE PAID BY
AUTOMOTIVE INDUSTRIES
Chestnut & 56th Sts.
Philadelphia 39, Pa.

Readers Service Dept.

Electroforming

An engineering electroforming booklet describes the process and the materials involved in its use. The three metals used are compared, and factors affecting production and designing of matrices are presented. *International Nickel Co., Inc.*

Circle L-9 on postcard for free copy.

Carbon Steel Tubing

Technical information in the form of a data card has been published on carbon steel tubing. It contains condensed data on mechanical and physical properties, upsetting, swaging, flanging, expanding, bending, and welding of seamless and welded tubing. *Tubular Products Div., Babcock & Wilcox Co.*

Circle L-10 on postcard for free copy.

Self-Locking Fasteners

Case histories and engineering data for the Rollpin self-locking fastener are featured in a recently issued catalog. Ample illustrations point out the versatility of the device. *Elastic Stop Nut Corp. of America.*

Circle L-11 on postcard for free copy.

Arc Welders

Information on engineering improvements and application refinements of the Type RA d-c arc welder are offered in a 12-page booklet, B-5433, that is currently available. Included is information on the performance characteristics of this welder, its physical construction, electrical specifications and ratings, and approximate dimensions and weights. *Westinghouse Electric Corp.*

Circle L-12 on postcard for free copy

USE THIS POSTCARD

Salt Bath Furnaces

Seventeen ways in which the submerged electrode salt bath furnace can increase metal-treating efficiency on 10 specific heat treating applications in the temperature range from 1100 F to 2400 F are described in Bulletin 128-B. *Ajax Electric Co.*

Circle L-13 on postcard for free copy

Spacing Device

The special Super-Spacer with its attachments and fixtures for milling, drilling, grinding, jig boring and slotting is discussed. Several illustrations show setups with the spacing device. *Hartford Special Machinery Co.*

Circle L-14 on postcard for free copy.

Gages

An informative literature piece is available on mechanical, electrical and air gaging. Called "High-Speed Automatic Gaging and Sorting," it has many illustrations showing the use of various gaging equipment. *Federal Products Corp.*

Circle L-15 on postcard for free copy.

Spacing Tables

The story of Bullard spacers as used by the Norton Co. is given in a nine-page booklet. Spacing tables and their importance in production are discussed. *The Bullard Co.*

Circle L-16 on postcard for free copy.

Gasoline Survey

The quarterly motor gasoline survey issued for July gives the octane numbers and tel content of gasolines in representative cities throughout the U. S. and Canada. It covers both regular and premium fuels. *E. I. du Pont de Nemours & Co., Inc.*

Circle L-17 on postcard for free copy.

Caustic Soda

A revised booklet covering all phases of caustic soda is now available. The literature deals with the manufacture, chemical and physical properties, economics, methods of handling and storing, technical data and methods of analysis. *Dow Chemical Co.*

Circle L-18 on postcard for free copy

Machine Tools

A quarterly publication containing numerous case histories of new and rebuilt machine tools has just been issued. Included in the first issue are examples showing how the Simmons six in. bar horizontal boring and facing machine has been adapted for special deep-boring operations. *Simmons Machine Tool Corp.*

Circle L-19 on postcard for free copy

Industrial Fasteners

A 22-page handbook, catalog B-2, contains information on industrial fasteners for metal to metal and metal to wood applications. Blind rivets and a variety of door latching and fastening devices are illustrated and described. *Southco Div., South Chester Corp.*

Circle L-20 on postcard for free copy

(*See preceding page*)

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

POSTAGE WILL BE PAID BY
AUTOMOTIVE INDUSTRIES
Chestnut & 56th Sts.
Philadelphia 39, Pa.

FIRST CLASS
Permit No. 16
(Sec. 34.9 P.L.&R.)
Philadelphia, Pa.

Readers Service Dept.

THIS POSTCARD VOID AFTER OCT. 15, 1952

Please send me additional free information on the items described in this issue of AUTOMOTIVE INDUSTRIES, the code numbers of which I have circled below:

8-15-52

FREE LITERATURE				NEW PRODUCTION & PLANT EQUIPMENT				NEW PRODUCTS			
L-1	L-7	L-13	L-19	E-1	E-7	E-13	E-19	P-1	P-7	P-13	P-19	P-25
L-2	L-8	L-14	L-20	E-2	E-8	E-14	E-20	P-2	P-8	P-14	P-20	P-26
L-3	L-9	L-15	L-21	E-3	E-9	E-15	E-21	P-3	P-9	P-15	P-21	P-27
L-4	L-10	L-16	L-22	E-4	E-10	E-16	E-22	P-4	P-10	P-16	P-22	P-28
L-5	L-11	L-17	L-23	E-5	E-11	E-17	E-23	P-5	P-11	P-17	P-23	P-29
L-6	L-12	L-18	L-24	E-6	E-12	E-18	E-24	P-6	P-12	P-18	P-24	P-30

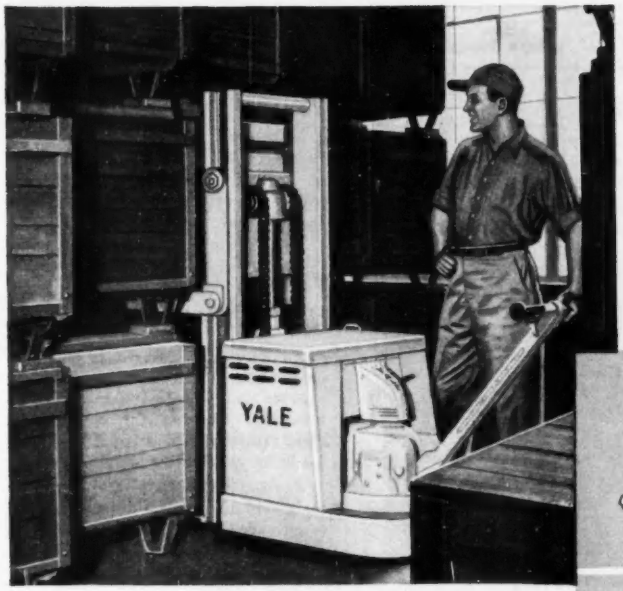
Your Name .....Your Title .....

Your Company or Business .....

Address .....
(No. & Street) (City) (Zone) (State)

Now...Industry does big-truck jobs at small-truck cost with

YALE WORKSAVERS



HIGH-LIFT PLATFORM WORKSAVER

SOLVE Time-Space Problems!

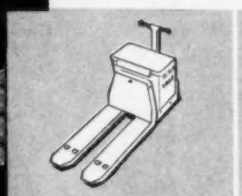
Move loads into and out of *any* storage or production area – easily and efficiently – with YALE ELECTRIC WORKSAVERS, industry's leading *powered* hand trucks!

SOLVE Manpower Problems!

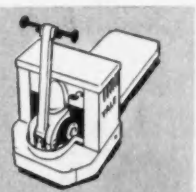
Practically any man in your plant – picked at random – can transport, lift and stack multi-ton loads, safely, surely, smoothly – with a YALE ELECTRIC WORKSAVER!

SOLVE Cost Problems!

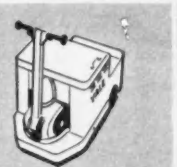
YALE ELECTRIC WORKSAVERS are low in initial cost, economical to maintain, operated easily by anyone. The money-saving answer to your handling problems!



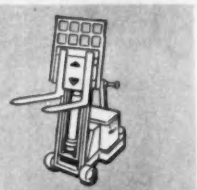
PALLET WORKSAVER



PLATFORM WORKSAVER



TRACTOR WORKSAVER



HIGH-LIFT FORK WORKSAVER

YALE WORKSAVER ELECTRIC HYDRAULIC POWERED HAND TRUCKS move right in—where big trucks are too big to fit—or too heavy for your floors. Yet they give you all the big-truck advantages...at far less cost: power travel—forward and reverse...power hydraulic lift...speed...everything! That's why, where size and weight make big trucks impractical, industry prefers YALE WORKSAVERS. Powered by economical electric power—they're your answer to countless materials handling problems in every plant or factory.

You'll Be Amazed By a Demonstration in Your Own Plant or Warehouse!

See it move about—lifting, transporting—through narrow doors, into elevators, and freight cars, over "low-load" floors. See how it saves you time and money. Ask your Yale Representative! He'll arrange a WORKSAVER demonstration in *your* plant. No obligation, of course!

There's a Yale Worksaver to meet your every need!

Yale is a registered trade mark of The Yale & Towne Mfg. Co.

The Yale & Towne Mfg. Co., Philadelphia 15, Pa.

YALE

MATERIALS HANDLING EQUIPMENT

MAIL THIS COUPON TODAY

The YALE & TOWNE Manufacturing Co., Dept. 78
Roosevelt Blvd. & Haldeman Ave., Philadelphia 15, Pa.

Cutting costs with YALE WORKSAVERS interests me, too.

☐ Please have your local Representative call on me.

☐ Please send me a free copy of *Picture Story of Yale Materials Handling Equipment.*

Company_____

Name_____ Title_____

Street_____ City_____ State_____

In Canada write: The Yale & Towne Mfg. Co., St. Catharines, Ont.

Gas and Electric Trucks • Hand Trucks • Hand and Electric Hoists • Pul-Lifts • Worksavers

NEW AIRCRAFT PRODUCTS

FOR ADDITIONAL INFORMATION, please use postage-free reply card on PAGE 65

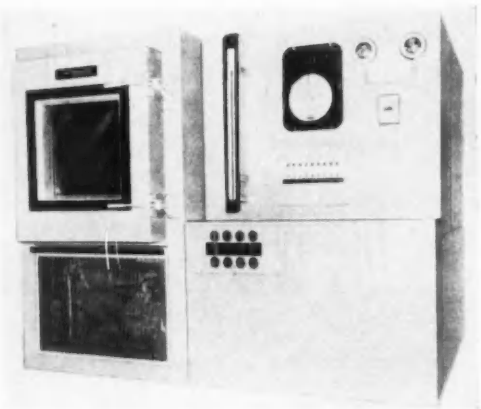
Altitude Test Chambers

A standard line of altitude chambers, designed to cover the majority of all altitude test requirements, has been announced. Known as the TenneyZphere, the chambers provide vacuum conditions simulating altitudes from sea level to approximately 80,000 ft.

In addition to simulated altitude conditions, the TenneyZphere also creates high and low temperatures and variable relative humidity conditions. Temperatures range from 200F to −100F. Relative humidities are from 20 per cent to 95 per cent.

Temperature recording controls, pressure controller and altitude gage or mercury manometer are standard equipment. All controls are mounted on the chamber for adjustment to different conditions. *Tenney Engineering, Inc.*

Circle P-5 on page 65 for more data



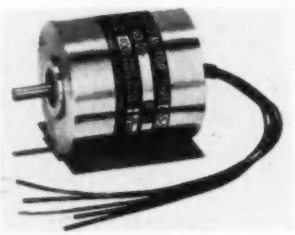
Tenney altitude testing chamber, TenneyZphere.

Small Servo Motors

A series of precision servo motors 1.7 in. diam and 1¾ in. long, for frequencies varying from 60 to 400 cycles, and in two, four or eight pole construction has been announced.

Stall torque is approximately two in. ounces. Housings are stainless steel or aluminum. Output shaft can be supplied to suit, with or without integral pinion.

The motors can be supplied to meet military specifications with regard to humidity, temperature, range, vibration, and altitude. *G-M Laboratories, Inc.*



G-M small servo motor.

Circle P-6 on page 65 for more data

Panel Vibrator

Instrument panel vibrators have been designed to introduce a vibration of known frequency and amplitude into instrument panels to increase meter accuracy and prevent sticking.

The vibrator is an electrically driven device operating continuously. Power for the vibrator is furnished by a fractional horsepower d-c motor with a two-pole, two-brush design.

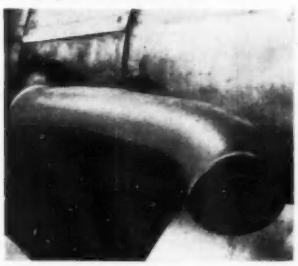
An unbalanced weight is mounted on the end of the armature shaft to provide the vibration action of the assembly. Shaking forces, at 2500 rpm, can be provided from 0.85 lb to 3.4 lb by varying the weight.

The weight of the unit is approximately 10 ounces. An integral circuit is provided to eliminate radio frequently interference. *Globe Industries, Inc.*

Circle P-7 on page 65 for more data

Globe panel vibrator.

Tailpipe Extension



A stainless steel tailpipe extension that is said to decrease wing cleaning costs over 70 per cent and eliminate exhaust gas destruction of wing de-icer boots, is now being manufactured. (Ledkote products.)

Circle P-8 on page 65 for more data

That's why they need

Sealed Power

KromeX

FULL-FLOW RING SETS

TOP COMPRESSION RING HAS SOLID CHROME FACE
factory-lapped to a light-tight finish

MD-50 STEEL OIL RING HAS CHROME-FACED SIDE RAILS
The only ring with the FULL-FLOW SPRING

Best for oil control even in
BADLY TAPERED
and
OUT-OF-ROUND BORES

All rings in KromeX Ring Sets are beveled or tapered to thread-line contact for quick seating and blow-by control.

A PREMIUM SET FOR LATE-MODEL CARS AND TRUCKS!

Sealed Power Piston Rings

SEALED POWER CORPORATION, MUSKEGON, MICHIGAN

Sole manufacturers of KromeX Ring Sets, MD-50 Steel Oil Ring, Full-Flow Spring, and GI-60 Groove Inserts.
Leading producer of Automatic Transmission Rings and Non-Spin Oil Rings.

The BUSINESS PULSE

Setback in Automobile Production as a Result of the Steel Strike May Reach Half Million Cars. Employment During June Set a New High Record for the Month. Retail Trade Is Slightly Above Last Year's Level.

Costliest Steel Strike

While the settlement of the steel strike has brought profound relief to the business community and to the nation, that relief is somewhat marred by the sobering realization that a terrible economic loss has been suffered. In addition to the strikers themselves, hundreds of thousands of employes were temporarily thrown out of work. Productionwise, it is estimated that by the time mill operations return to a normal basis, 19 million tons of steel will have been lost. Indeed, the loss may go even higher, inasmuch as the suspension of iron-ore shipments during the dispute has raised the threat of forced curtailment of steel operations next winter. The Secretary of Defense has said that the rearmament program has suffered a more serious setback than could have been inflicted by the worst possible bombing raid by an enemy. Automobile production has suffered to the extent of a quarter of a million cars, with the likelihood that another quarter million will be lost before the industry can build up its steel supplies. These are but a few of the most conspicuous effects of the costliest steel strike in the nation's history.

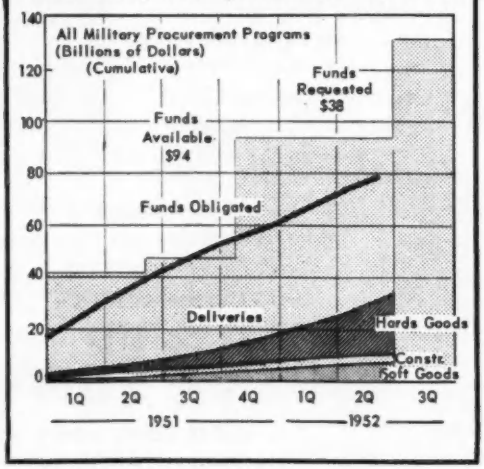
It is not known exactly what device the President employed in effecting an agreement. It is known, however, that the Government was, in effect, a party to the final settlement, since stabilization officials made concessions in price ceilings on steel. It is quite obvious that these concessions were made with the greatest reluctance and apparently with some resentment. The Economic Stabilization Administrator, in instructing the Price Stabilization Director to grant a price increase which "exceeds stabilization policy," accused the companies of having held a "loaded gun" to the Government's head. He said further that he could not "conceive of any good reason—economic or otherwise—for the steel companies' refusal to prevent the strike or the failure to reach agreement long before this on terms to end it." Totally lacking was any mention of the union's action in calling the strike or its refusal to accept the companies' offers.

This Survey Is Prepared Exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Company of New York.

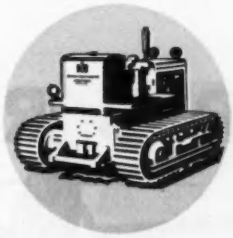
According to the Stabilization Administrator, an effort will be made to "isolate" the effects of the increase of $5.20 a ton in steel prices. While he offered no explanation as to how this would be done, his statement suggests either that steel-using industries will be forced to absorb the rise in costs or that employes in other industries will be compelled to forego wage increases comparable to those won by the steel workers, or both. Action taken by John L. Lewis in serving a sixty-day notice of termination of the contract which the United Mine Workers have with Northern bituminous coal operators suggests that estabilization officials will shortly find their efforts at "isolation" put to the test. The Lewis action, which was not unexpected, is inter-

(*Turn to page* 108, *please*)

Military procurement: $34 billion delivered; over $50 billion on order



[*Source: Director of Defense Mobilization*]



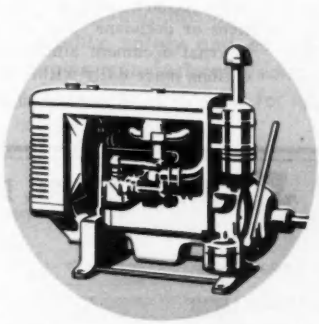
You'll find
THOMPSON VALVES
wherever you see
this trademark . . .

INTERNATIONAL HARVESTER

INTERNATIONAL HARVESTER . . . a leading manufacturer of farm and industrial tractors, highway tractors and trucks, and stationary engines . . . uses Thompson Valves in engines of all sizes from the "Farmall Cub" to giant trucks.

Thompson has over 50 years of experience in the metallurgy and engineering of valves for internal combustion engines. Leading engine builders count on Thompson for the important developments in valve alloys, valve designs, and the famous Thompson-developed "Rotocap" and "Rotovalve" systems of valve rotation.

Take a tip from International Harvester and other leading engine builders . . . count on Thompson for engineering leadership.



VALVE DIVISION

Thompson Products, Inc.

CLEVELAND 17, OHIO

AIRBRIEFS

By ROBERT McLARREN

Production Furor

The entire aircraft manufacturing industry, the Air Force, and Naval Aviation have been thrown into a swivet by the leak of an extensive Aircraft Production Board survey of current procurement plans to the press. Reasons for the uproar are obvious: the study recommends cancellations of current production programs on the Republic F-84G, Lockheed F-94C, Northrop F-89, Martin B-57A, Grumman F9F and F10F, Douglas F3D, Wright J-65, Westinghouse J40 and P&W R-4360 engines. These slashing proposals were recommended to the services by W. L. Campbell, acting chairman of the APB division of the Defense Production Administration. In each case, these aircraft and engines would be replaced in production by newer models, and in some cases by those of rival manufacturers.

"The Plan" Ruined

These recommendations, ostensibly secret but published in a variety of newspapers and magazines, virtually torpedo the two-year planning and production expansion program of the services in which all of these aircraft and engines have been placed into accelerated production. Campbell takes the view that since models of substantially superior performance are now available, it is foolish to continue to produce the old ones and that these new models must replace the old on the assembly lines immediately. Although his views represent somewhat naive thinking, they nevertheless coincide broadly with Air Force and Navy planning. The basic difference between the two is the fact that Campbell wants to make these changes immediately, whereas the services want to complete their present 143-wing (USAF), 16 air group (Navy) programs with current models first — and then undertake to order entirely new models into production.

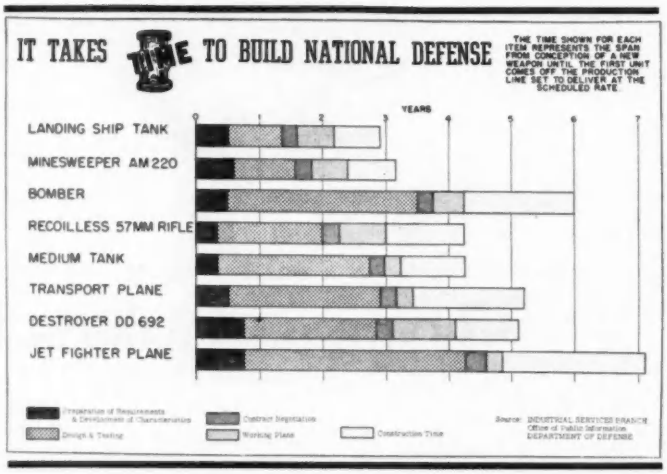
Legal Status

The exact weight Campbell's program carries is not clear. Firstly, it makes recommendations to the services and he has asked them to "show cause" why these measures should not be formalized into aircraft production schedules in the immediate future. The authority of the Aircraft Production Board stems from the Defense Production Administration, established by the President on Jan. 3, 1951. Thus, Campbell's program may be assumed to carry White House authority.

The DPA is well authorized to prepare the programs and to directly control aircraft production. The point at issue is whether or not this function proceeds *following* service determination of items to be procured or whether APB has authority to select the items as well.

Henry H. Fowler, present Defense Production Administrator, in a letter to Aircraft Industries Association president D. C. Ramsey, explained that Campbell's recommendations "were not in any sense directives or decisions" and were contained in a classified internal document similar to many other recommendations made daily within the DPA.

(*Turn to page* 82, *please*)



Where POWER FAILURE MAY MEAN DISASTER

SYNCHRO-START controlled Engine Generator-Sets will instantly provide a continuous flow of auxiliary power for the duration of the failure.

Within seconds after the main power fails, the **SYNCHRO-START CONTROLS** automatically bring in stand-by generator sets to provide emergency power. When the main service is restored, this same control stops the engine and resets itself for the next power demand.

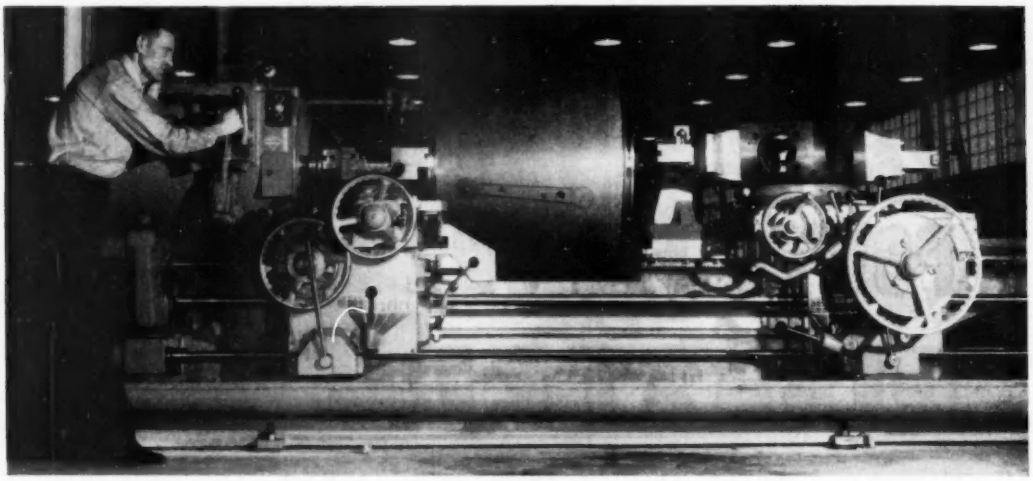
Besides automatically Starting and Stopping the engine, our Model 1436 control protects the engine against any abnormal conditions while running — such as, low oil pressure, overheating, fuel or ignition failure, over-speeding and over-cranking, in which case it will stop the engine and signal an operator with visual or audible alarms and indicating lights in the control to show the exact cause of the trouble, should it ever occur.

SYNCHRO-START AUTOMATIC CONTROLS can be furnished for any model and any number of internal combustion engines used for any power application. Their use throughout the world for the past 20 years has proven their dependability, safety and economy.

Ask your engine manufacturer, dealer, architect, engineering firm or write us for information and catalogue describing our full line of control products.

SYNCHRO-S PRODUCTS INC.

8151 NORTH RIDGEWAY AVENUE, SKOKIE, ILLINOIS



Special Warner & Swasey gap bed lathe for turning jet engine exhaust cones.

Special Lathe Saves Time In Turning Jet Engine Cones

TIME required to machine large jet engine exhaust cones has been markedly cut with a specially designed lathe at Ryan Aeronautical Co. Built by Warner & Swasey to meet Ryan's requirements, the first of six of these unique gap lathes is now in operation.

With a single setup, the new lathe machines the flanges at both ends of the big cones. Cutting tools turn and form the flanges to size in one pass.

To produce the new machines, Warner & Swasey modified the design of their heavy-duty lathes in a major way to adapt them to Ryan jet engine production work. Special tools and tool holders were devised so that the cones could be machined from both ends.

With a Ryan-built arbor and trunnion and an electric hoist and swinging crane, one man can load and operate the machine, without assistance.

• • •

French Automobile Industry Needs Free Enterprise System

PARIS, FRANCE

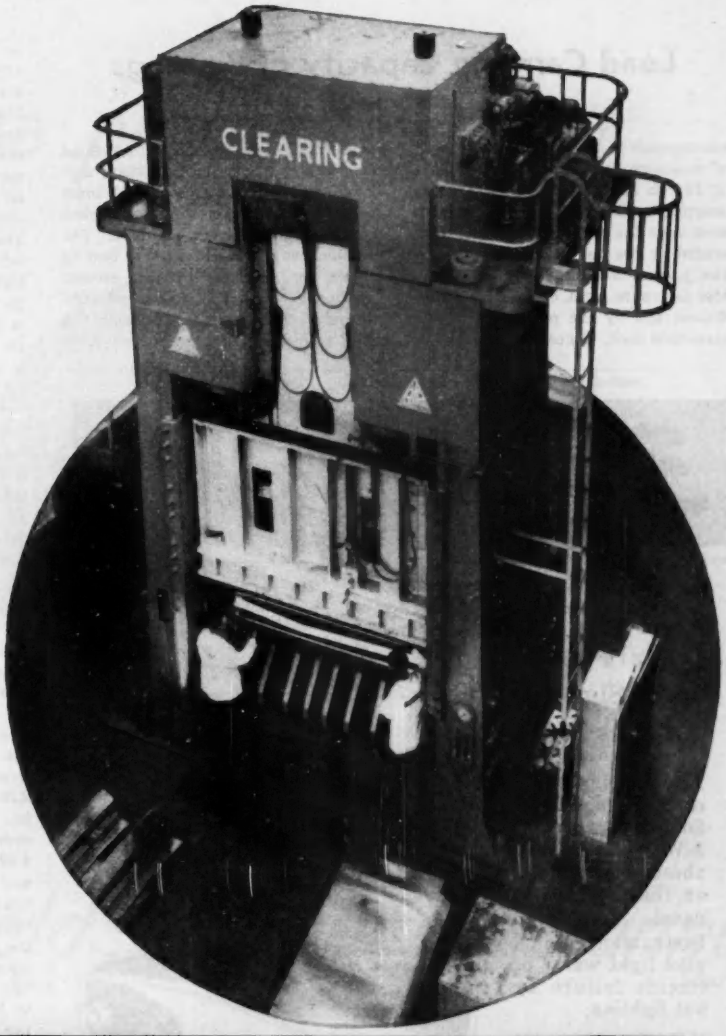
By W. F. Bradley

Special European Correspondent for AUTOMOTIVE INDUSTRIES

STATE-OWNED Renault increased its automobile production 25 per cent last year, compared with that of 1950, with a total of 167,014 vehicles. This total was made up of 99,886 rear-engined passenger cars, 19,651 660-lb delivery vans, 20,912 trucks of 3000-lb load capacity, 11,417 trucks of 2½ tons, 1100 five-ton trucks, 1143 seven-ton trucks, 354 twelve-ton road tractors, 468 coaches, 11,504 of a colonial series, and 579 of the new 122 cu in. Fregate passenger car. Renault still is the biggest producer, being 65 per cent ahead of Citroen, 107 per cent ahead of Peugeot, and 293 per cent in front of Simca. These three firms are now all growing faster than Renault. By the end of 1951 the Renault staff had increased by 4000 to a total of 53,000 workers.

After payment of all taxes the net profit was $2,241,245, on the basis of the dollar at 400 francs. The State received $1,000,000 and an equal

(*Turn to page 90, please*)



WHERE BOMBERS ARE MASS PRODUCED

At the Wichita (Kan.) Division of Boeing Airplane Company they're producing the world's fastest bomber in quantity for the United States Air Force. Here is a canopy beam section coming off the 500-ton capacity Clearing double action hydraulic press which is used for many of the deep draw parts of the B-47 Stratojet. With airplanes as with almost anything made of metal, if you want lots of them quickly at lowest cost, it will pay you to consider Clearing presses.

CLEARING MACHINE CORPORATION

6499 WEST 65TH STREET ★ CHICAGO 38, ILLINOIS

HAMILTON DIVISION, HAMILTON, OHIO

CLEARING PRESSES

THE WAY TO EFFICIENT MASS PRODUCTION

Load Carrying Capacity of Bearings

(*Continued from page 45*)

corresponds to the curve (2), Fig. 7, of minimum film thickness $h_r = 0.375 \times 10^{-3}$ in. and only for the conditions assumed in the problem. It is dependent upon the bearing finish as represented by the height of asperities on the journal and bearing, the diametral clearance ratio, by operating conditions and by the properties of the materials used. Since the criterion of performance is based on total load carrying capacity rather than unit load, the solid curves in Fig. 7 must be considered rather than the dashed curves representing unit load. The significance of the curves may best be shown by assuming that a certain bearing is to support a load of 4000 lb and that the sum of the asperities on the shaft and the bearing is 0.375×10^{-3} in. which corresponds to curve (2) of Fig. 7. Since the sum of the asperities represents the minimum film thickness, or zero oil film thickness, two points on the total load curve represent the minimum and maximum values of l/d at which the oil film is ruptured. For the load of 4000 lb these are $l/d = 0.65$ and 2.20. The lower value is not as greatly influenced by shaft deflection as the higher value of l/d but rather by the increase in end leakage due to the short bearing length. Although the total load carrying capacity is the same for both bearings (4000 lb), the unit load for $l/d = 0.65$ is is 1180 lb/in.^{2} and for $l/d = 2.20$ it is 350 lb/in.^{2} The maximum load which the bearing can carry is approximately 6000 lb or 850 lb/in.^{2} at a value of $l/d = 1.30$.

Circumferential Oil Groove

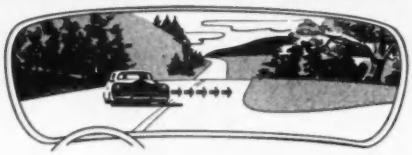
The fallacy of the statement that the maximum load carrying capacity is obtained with a bearing where $l/d = 0.7$, and that the effect of a circumferential oil groove in a long bearing is to divide the bearing into two parts of reduced l/d ratio and an increased load carrying capacity is evident from a study of Fig. 7. In the above example the maximum permissible l/d ratio was found to be 2.20 for a load of 4000 lb. For a 2.25-in. diameter shaft, this l/d ratio corresponds to a bearing length of 4.95 in., a projected area of 11.1 in.^{2} and a unit load of 360 lb/in.^{2} If the bearing is divided by a circumferential oil groove, the new l/d ratio for the two halves would then be 1.10 which according to the dashed curve (2) Fig. 7 has increased the unit load to 1000 lb/in.^{2} Since the total bearing area, considering the groove width negligible, will still be 11.1 in.^{2} the total load carrying capacity would be $11.1 \times 1000 = 11{,}100$ lb which does not check the solid curve (2) Fig. 7 of total load for the new l/d ratio which indicates a maximum value, for $l/d = 1.10$, of 6000 lb. Recalling that the shaft deflection reduced the oil film thickness at the end of the bearing, the effect of the circumferential groove without shaft deflection, may be shown by equation (1) which may be written

$$p_m = \frac{\phi\mu\omega}{2c\psi^2} = \frac{k}{c}$$

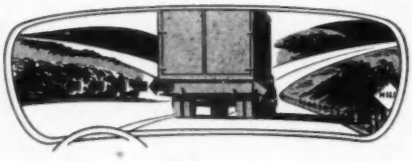
where for the same bearing and the same running position ϕ, μ, ω and ψ are constant, therefore the mean load is inversely proportional to $c = d + l/l$.

(*Turn to page 78, please*)

Tung-Sol Signal Flashers make Signal Systems Safer!

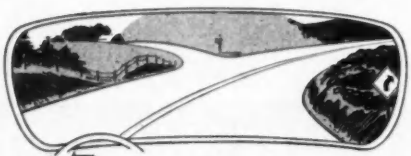


Flashing lights are commanding. Tung-Sol Flashers provide 3-Way Safety — ahead — behind and on the instrument panel.



Instrument panel pilot light warns of circuit failure by *not lighting.*

More than 13,000,000 have been used. Most of them outlast the cars they're on.

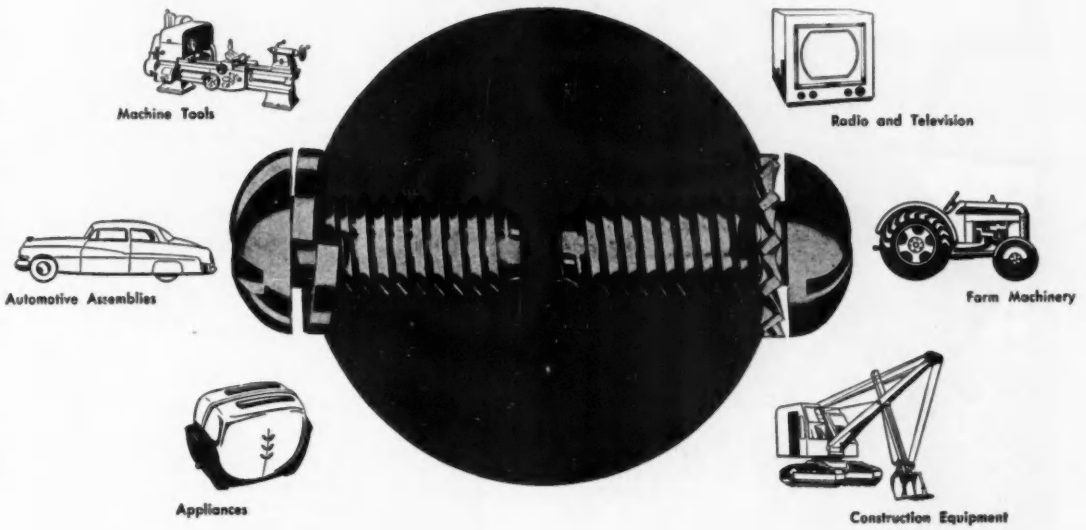


TUNG-SOL®
SIGNAL FLASHERS
Dependable!

Tung-Sol makes All-Glass Sealed Beam Lamps, Miniature Lamps, Signal Flashers, Picture Tubes, Radio, TV and Special Purpose Electron Tubes.

TUNG-SOL ELECTRIC INC., Newark 4, N. J. • Sales Offices: Atlanta Chicago • Culver City • Dallas • Denver • Detroit • Newark • Philadelphia

Reduce production cost



in ALL fields of manufacturing

with EATON SPRINGTITES & SEMS!

WHEREVER YOU use bolted assemblies, there are economies to be gained through the use of EATON Springtites and Sems. Under actual production line conditions, these top-quality bolts or thread-cutting screws that are pre-assembled with Reliance Spring lock washers or multitooth washers cut assembly operations from 8 to 3 motions. Reduce production costs and improve product quality. One item, instead of two, cuts paper work and balances inventory.

Why not gain these savings in your own assembly operations? Engineering data and samples furnished upon request.

For the Finest—Specify EATON SPRINGTITES and SEMS

EATON MANUFACTURING COMPANY, RELIANCE DIVISION

OFFICE AND PLANTS • MASSILLON, OHIO

SALES OFFICES NEW YORK • CLEVELAND • DETROIT • CHICAGO • ST LOUIS
SAN FRANCISCO • MONTREAL

For the original bearing $\frac{l}{d} = 2.20$ and

$l_1 = 2.20 \times 2.25 = 4.95$ in.

$$C_1 = \frac{d + l_1}{l_1} = \frac{2.25 + 4.95}{4.95} = 1.45$$

$$\text{and } p_{m1} = \frac{k}{1.45}$$

For the bearing with $l/d = 1.10$

$$l_2 = 1.10 \times 2.25 = 2.47$$

$$C_2 = \frac{2.25 + 2.47}{2.47} = 1.91$$

$$\text{and } p_{m2} = \frac{k}{1.91}$$

from which the mean load for the bearing with the circumferential groove will be

$$p_{m2} = \frac{1.45}{1.91} p_{m1}$$

or expressed in percentage reduction of load carrying capacity due to the addition of the circumferential groove

$$\frac{p_{m1} - p_{m2}}{p_{m1}} = \frac{\frac{k}{1.45} - \frac{k}{1.91}}{\frac{k}{1.45}}$$

$$= \frac{0.69 - 0.52}{0.69} = 24.6\%$$

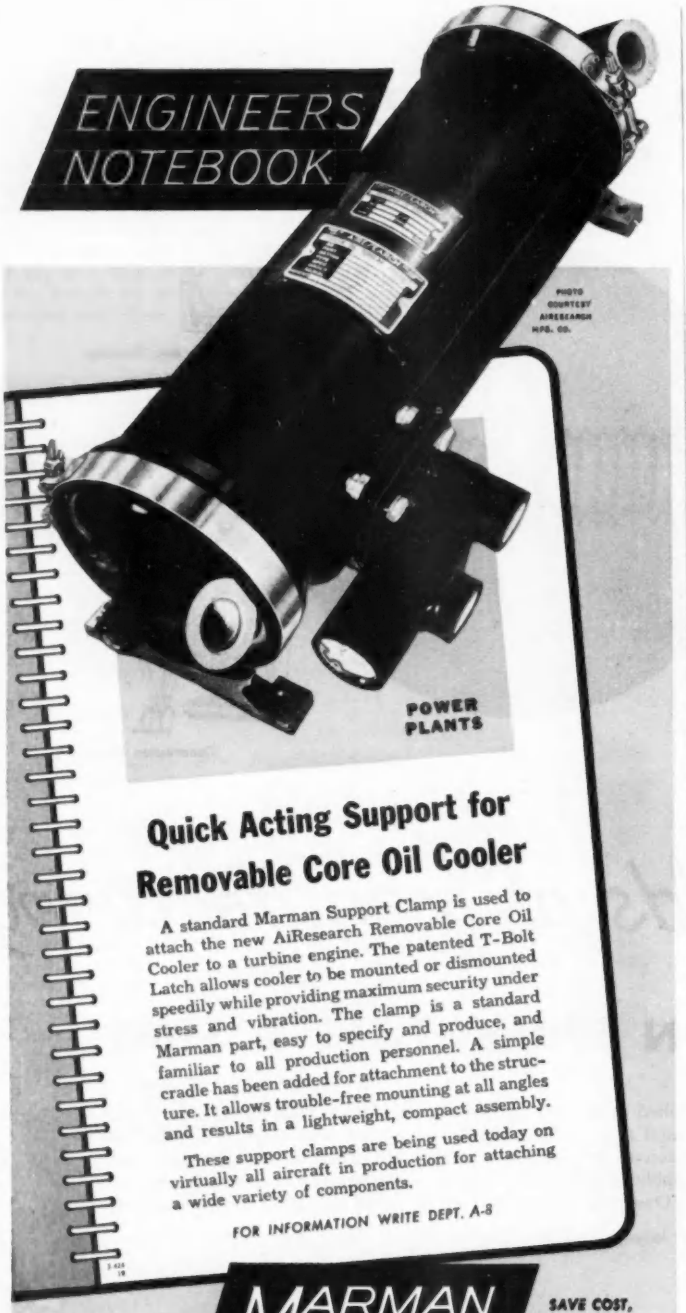
The calculations indicate that for the assumed physical dimensions of the journal and bearing, physical properties of the lubricant, and a given journal speed, the effect of a circumferential oil groove in the bearing is to reduce the unit load carrying capacity of the bearing by 24.6 per cent. This is without consideration of the influence of shaft deflection, which will further decrease the load carrying capacity as previously indicated.

Summary

The load carrying capacity for a journal bearing operating under a fixed set of conditions is limited by the elasticity of the journal material at high l/d ratios due to oil film rupture at the ends of the bearing. Low l/d ratios reduce load carrying capacity through excessive oil leakage at the ends of the bearing. The minimum film thickness is determined by the bearing and journal surface finishes. Circumferential oil grooves reduce the load carrying capacity regardless of the l/d ratio of the bearing.

REFERENCES

[1] O. Reynolds: Phil. Trans. Royal Society 177(1) p. 157 (1886).
[2] B. Tower: Proc. Inst. Mech. Eng. 1883, p. 632; 1884, p. 29; 1885, p. 58.
[3] A. Sommerfeld: Zeit. für Math. u. Phys. 1904.
[4] V. Vieweg: Petroleum Zeitschrift 1922, No. 34.
[5] Gümbel-Everling: Reibung u. Schmeirung im Maschinenbau—Krayn 1925.
[6] Falz: Grundzüge der Schmiertechnik—Springer 1931.


ENGINEERS NOTEBOOK
PHOTO COURTESY AIRESEARCH MFG. CO.
POWER PLANTS
Quick Acting Support for Removable Core Oil Cooler
A standard Marman Support Clamp is used to attach the new AiResearch Removable Core Oil Cooler to a turbine engine. The patented T-Bolt Latch allows cooler to be mounted or dismounted speedily while providing maximum security under stress and vibration. The clamp is a standard Marman part, easy to specify and produce, and familiar to all production personnel. A simple cradle has been added for attachment to the structure. It allows trouble-free mounting at all angles and results in a lightweight, compact assembly.
These support clamps are being used today on virtually all aircraft in production for attaching a wide variety of components.
FOR INFORMATION WRITE DEPT. A-8
MARMAN PRODUCTS CO., Inc.
11214 EXPOSITION BLVD.
WEST LOS ANGELES 64, CALIF.
SAVE COST, TIME AND WEIGHT WITH MARMAN
STANDARD CLAMPS FOR SPECIAL APPLICATIONS

Make More Money on Auto Radios

"What we're making on radios doesn't add up to peanuts when you figure on our production delays, field complaints, and . . ."

"Take it easy, Fred! Let's talk to Bendix. On their record, they can give us the production...the quality... and the price we're looking for."

TALK TO Bendix MOST TRUSTED NAME IN Radio

That's right! Bendix can *positively* show you how to make more profit on your automobile radios.

First of all, Bendix® Radio has solved more problems *and tougher problems* than any other radio manufacturer. That's a plus to remember if you get snowed under with field complaints about your present radio. And, too, Bendix understands quantity production—from the precision methods involved to the split-second timing that's necessary to meet tight schedules. It is this production know-how that has made Bendix a leading automotive supplier.

Working closely with the automotive industry has taught Bendix plenty about price, too. They know that on high-production units, a few cents can mean the difference between profit and loss. Their engineers are constantly developing circuits with fewer components and lower cost.

If you want to cut the cost and improve the quality of your auto radios, call Bendix.

®REG. U. S. PAT. OFF.

Get the complete story from our Detroit office.

261 McDougall, Detroit 7, Mich. • Phone: LOrain 8-1419 and 8-1313

BENDIX RADIO DIVISION of Bendix AVIATION CORPORATION

BALTIMORE 4, MARYLAND

New Austrian Trucks and Buses

(*Continued from page* 41)

the engine. V-belts are used for driving the water pump and the radiator fan. The water flow is split at the pump, one stream going directly to a bank of cylinders, while the other passes through the heat exchanger to the second bank of cylinders.

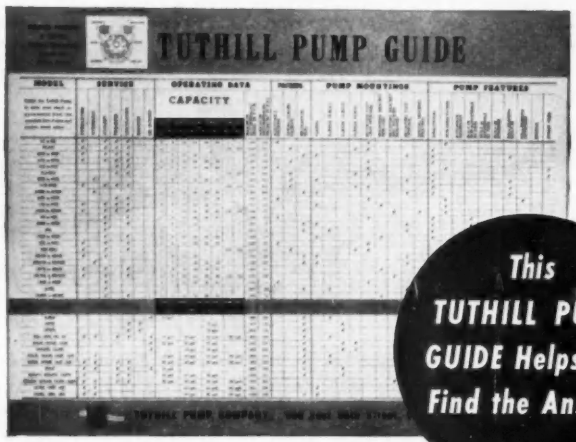
Lubrication is of the full pressure type, with the pump located low down in the sump. Oil is first delivered to a heat exchanger, in which it gives up heat to the cooling water, and then passes through both a laminar-flow and a magnetic filter to the central distributing pipe in the bottom of the V. From here it is delivered to the main and the connecting rod bearings. Provision is made for spraying oil on the cylinder walls.

The four-cylinder engine of 386.4 cu in. displacement has a dry weight, including accessories, of 1190 lb. Its dimensions are: Length 34 in.; width 36.2 in.; and height 47 in. Its electric starter operates at 24 volts. For the six-cylinder model, of 579.6 cu in., the displacement output is 177 hp at 2000 rpm, and dry weight, including accessories, is 1532 lb. Dimensions are: Length 43 in.; width 36.2 in.; and height 47 in.

The four-cylinder engine is used in a six-ton truck chassis, with forward mounting, the single plate clutch and five-speed transmission forming a unit. Direct drive is in fourth speed and fifth is an overdrive with a ratio of 1 to 0.75. The gears are constant mesh type, with dog clutch engagement. An open drive shift carries the power to a double reduction rear axle —helically-cut spur pinions and spiral bevel.

The six-cylinder engine has recently been fitted with a rear longitudinal mounting, in a 39-passenger bus. The power plant, together with its radiator, is carried on a sub-frame which can be withdrawn from the rear. This differs from the truck in that the final drive to the rear wheels is through universally jointed swinging axle shafts, the wheel hubs being carried on a dead axle beam. The general construction is square section, electrically welded steel tubes, with screw - pastened aluminum panels. Total weight of this coach is said to be between eight and eight and a half tons.

NEW EASY WAY TO SELECT THE RIGHT PUMP FOR THE JOB



This TUTHILL PUMP GUIDE Helps You Find the Answer

To save you time and trouble in selecting the pump best suited to your application, Tuthill engineers have developed this revolutionary new Pump Guide. Here, in one easy-to-use chart, is a volume-full of information on the complete line of Tuthill Pumps.

At a glance, it shows you the services for which each model is built, together with performance characteristics, types of packing, mounting styles and distinctive features that enable you to fit the pump to your need, rather than the need to the pump.

Copies of this helpful guide are now available on request. Write for yours today—there's no obligation.

Tuthill Positive Displacement Pumps Serve Industry in Lubrication, Hydraulic, Coolant, Oil Burning, Circulating and Transfer Service.

25th Anniversary

TUTHILL PUMP COMPANY
939 East 95th Street • Chicago 19, Illinois

Honeywell Expands Hydraulic Testing

A new hydraulic testing laboratory has been established by the Aeronautical Div. of Minneapolis-Honeywell Regulator Co. in an expansion of its research and development work in the field of hydraulic actuators.

The new facilities, which include numerous devices for producing a wide range of test pressures, will be particularly useful in carrying out a miniaturization program aimed at producing smaller, faster responding, and more powerful servos, according to the company.

Partial Operations Underway at New Vanadium W. Va. Unit

Production of ferro silicon was started recently in two of the electric arc furnaces in the new, unfinished, $8 million alloy-producing plant of Vanadium Corp. of America at Graham, W. Va. The remaining furnaces are scheduled to be placed in operation shortly.

MAKE A TON OF SHEET STEEL GO FARTHER
Specify—
N·A·X
HIGH-TENSILE STEEL
... And
"MAKE YOUR PRODUCT LAST LONGER"

Containers and pressure vessels assure greater service when made of N-A-X HIGH-TENSILE steel. The durability of this low-alloy steel, its greater resistance to corrosion and abrasion, and its exceptional fabricating and welding qualities are important characteristics. The greater strength of N-A-X HIGH-TENSILE steel permits fabrication of containers from thinner sections—reducing costly deadweight to a minimum. If you are interested in effecting economies in barrels, drums or cylinders, investigate N-A-X HIGH-TENSILE steel.

GREAT LAKES STEEL CORPORATION

N-A-X Alloy Division — Ecorse, Detroit 29, Mich.

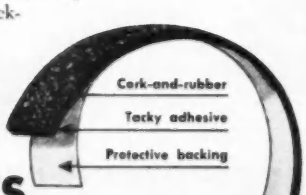
NATIONAL STEEL CORPORATION

This cushion tape goes on fast

The quick way to apply a cushion anywhere is to use Armstrong's DK-153 Tape. Use it for anti-skid pads to protect finishes, as a cushioning strip to stop squeaks and rattles, or for any other purpose where you need an easy-to-use, high-friction cushioning material. For instance, it is an excellent material to use for cushioning fragile parts during shipment.

DK-153 Tape is a combination of resilient cork and synthetic rubber backed with a pressure-sensitive adhesive. To apply it, you just peel off the cloth backing and press the adhesive side against any clean, dry surface.

Armstrong's DK-153 Tape comes in various widths and thicknesses. It is available in die-cut shapes, as illustrated above, as well as in sheet and tape form. For samples, write on your company letterhead to Armstrong Cork Company, Gaskets and Packings Department, 8508 Arch Street, Lancaster, Pennsylvania. Available for export.



ARMSTRONG'S DK-153 TAPE

AIRBRIEFS

(*Continued from page 72*)

More Planning Coming

In addition to the Campbell program, the Research and Development Board is now finishing up a set of recommendations as to the present large number of different aircraft models and as to whether these can be reduced without sacrificing combat effectiveness. The Air Force has ordered 39 and the Navy 27 different models of aircraft under the 1953 fiscal year procurement program. Thus, the RDB study is certain to also recommend cancellation of certain contracts for aircraft and their replacement on the assembly lines by other models of rival manufacturers.

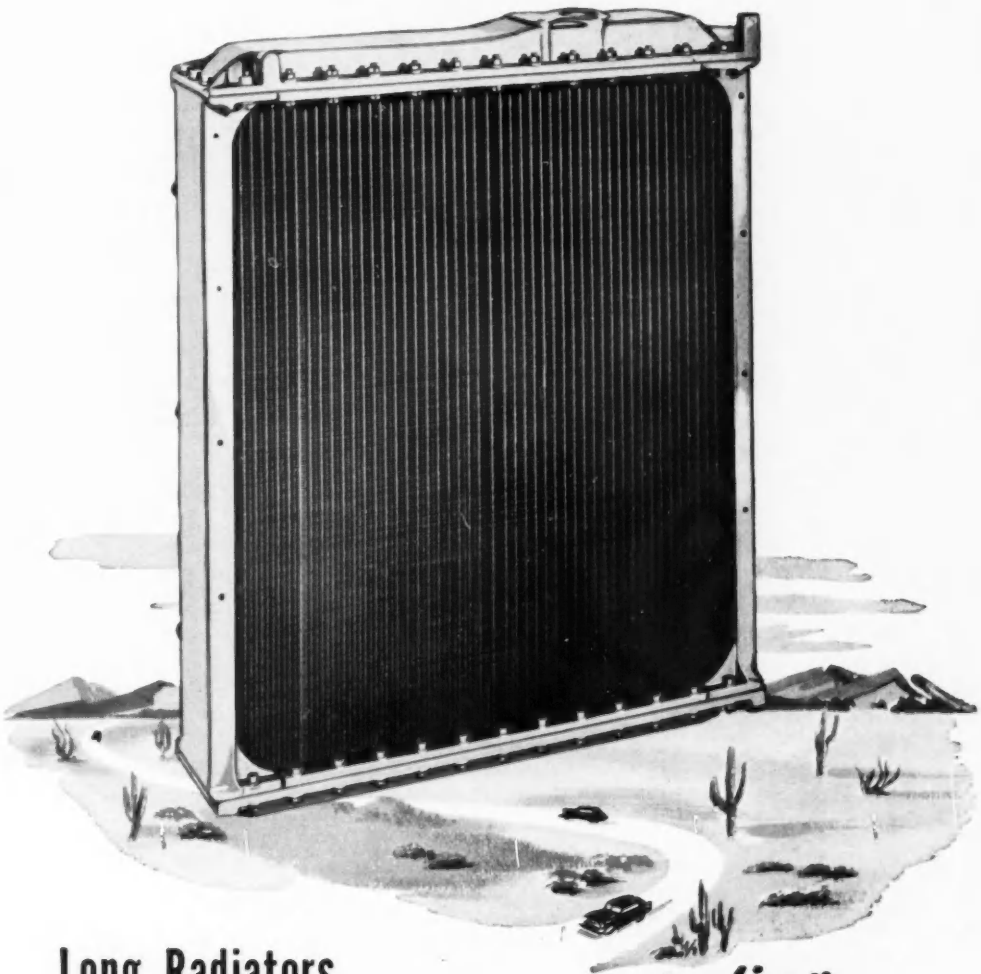
Outcome Certain

It seems certain that rather drastic revisions of the current aircraft production program are coming this year. Both services have "frozen" the vast majority of their aircraft production lines for the past two years in the paramount interest of getting their expanded combat unit structures equipped. This approach has also aided enormously in expanding tooling and production capacity by tailoring it to specific models. However, the recommendations of the Aircraft Production Board and the Research and Development Board that the current range of models be reduced and that new models be placed on the assembly lines are assured of prompt acceptance by the military services because of the high governmental stature of these two groups. Additionally, many of these decisions were arrived at independently by the services themselves many months ago. Thus, the U. S. aircraft production program, touched off by Korea in July, 1950, is now nearing its second important stage; the introduction of advanced models on the assembly lines.

Two Million Each

Latest sales of the Lockheed Super Constellation and the Douglas DC-7 civil transports have averaged better than two million dollars per airplane (the first production DC-3 transports cost $95,000 each!). This figure includes necessary orginal spare parts but is indicative of the phenomenally expensive character of the modern transport airplane. It is also a measure of the increased responsibility

(*Turn to page 87, please*)



Long Radiators *for Balanced Cooling*

With nearly fifty years of specialization in radiator manufacturing, we offer the automotive manufacturer important advantages:

The widest possible range of sizes and capacities.

Engineering design and production skill that only long years of specialization can bring.

The background of countless applications of our concept of *balanced engine cooling.*

LONG MANUFACTURING DIVISION
Borg-Warner Corporation
DETROIT 12, and WINDSOR, ONT.

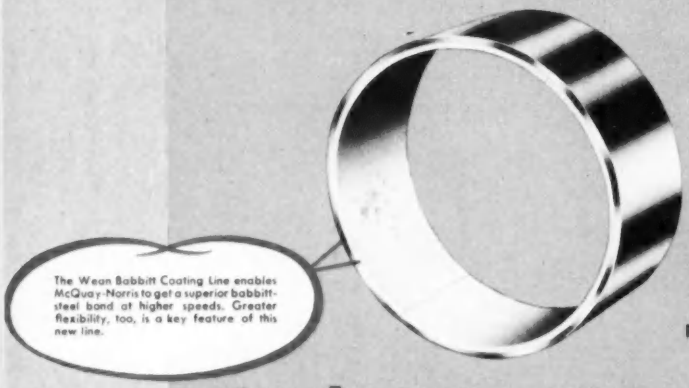
ENGINEERING B-W PRODUCTION

LONG

CLUTCHES • RADIATORS • TORQUE CONVERTERS
OIL COOLERS

Problem...

GETTING FASTER, GREATER RANGE BABBITT COATING FOR MORE EFFICIENT BEARING MANUFACTURING . . . . .



The Wean Babbitt Coating Line enables McQuay-Norris to get a superior babbitt-steel bond at higher speeds. Greater flexibility, too, is a key feature of this new line.

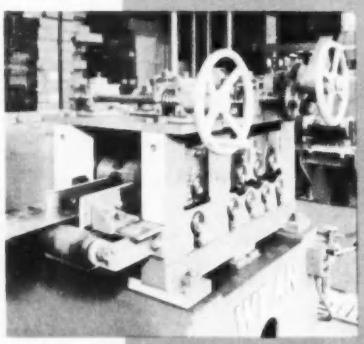
McQuay-Norris, one of the nation's leading manufacturers of bushings and bearings, found it necessary to multiply their production of babbitt coated material. They wanted a babbitt coating line that would cover a wide range of sizes at speeds that would satisfy anticipated production—a precision line that would give them a perfect bond conforming to the high quality standards of the company.

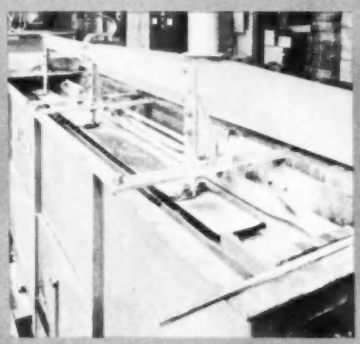
Solution...

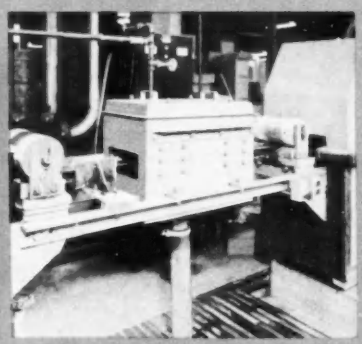
COMPLETE LINE DESIGNED AND BUILT BY WEAN EQUIPMENT DELIVERS BETTER QUALITY, WIDEST RANGE AT FASTEST SPEEDS

After thoroughly checking special machine manufacturers McQuay-Norris authorized the Wean Equipment Corporation to design and build a line that would give them the high quality, flexibility and high production speeds they demanded.

Wean Equipment engineers set to work designing the complete line from pay-off to take-up reels. The finished product is a compact, high-speed line that will process material ranging from .036" x 2½" to .125" x 7" at speeds up to 50 F.P.M.





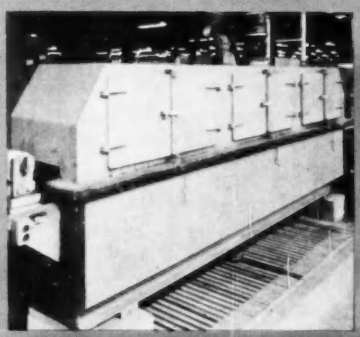


Strip moves from 1. Leveler to... 2. Alkaline Electrolytic Cleaner to... 3. Fresh Water Spray Rinse to...

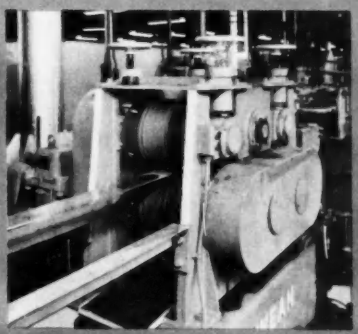
Requiring minimum floor space, the Wean line levels, cleans, pickles, tins, continuously casts a babbitt coating, precision machines to desired thickness recovering excess material and neatly coils coated material ready for fabrication.

Those who have watched the McQuay Line perform are impressed with its efficiency—the simplicity of operation and ease of maintenance. The line enables McQuay-Norris to produce bearings and bushings of precision quality at unparalleled high speeds. Changeover to different gauges, widths and coating thicknesses requires a minimum of time and labor.

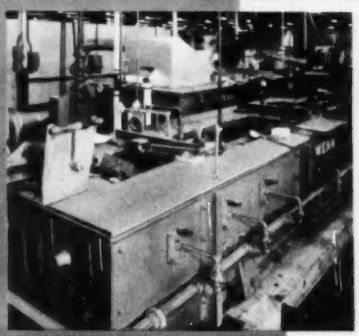
This is another example of Wean Equipment versatility and engineering skill. It is another reason why — when you're looking for the finest in special machinery, continuous lines, slitting, shearing and leveling equipment or wire machinery — you should think first of Wean — designers and builders of tomorrow's machinery today.



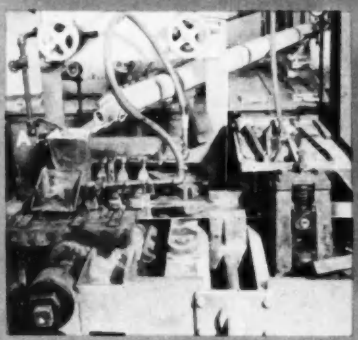
4. Electrolytic Pickle to . . .



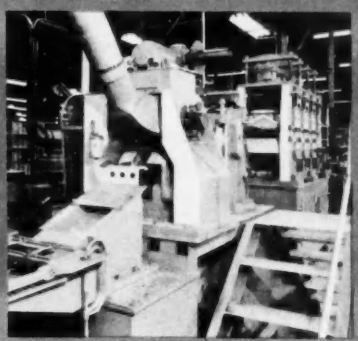
5. Intermediate Pull Rolls to . . .



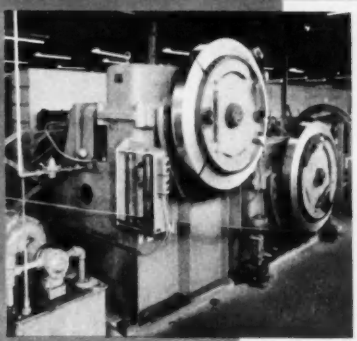
6. Tinning and Pre-heating Furnace to . . .



7. Babbitt Casting Head to . . .



8. Milling, Skiving and Main Pull Rolls to . . .



9. Double Head Recoiler.

MACHINERY TODAY IS THE BUSINESS OF THE

EQUIPMENT CORPORATION

Wean

Cleveland, Ohio

JOHNSON SLEEVE BEARINGS

Engineered for **YOUR** *Application*

JOHNSON BRONZE engineering is far more than designing bearing types and shapes. It is based on thorough studies of your product, its service requirements and your methods of assembly. Johnson engineers start with complete information—load, speed, shock, operating temperatures, lubrication, corrosive conditions and other data. Design is often affected by installation and mounting methods. After this study they may recommend one of several types of sleeve bearings and the correct bearing alloy for your use. And they will design the bearing to your requirements, working closely with your engineers. If this kind of service will be valuable to you, write, wire or call for an appointment.

JOHNSON BRONZE CO. • 625 South Mill St. • New Castle, Pa.

SLEEVE BEARING HEADQUARTERS SINCE 1901

JOHNSON B BEARINGS
Sleeve-Type

BRONZE-ON-STEEL
—copper alloy

STEEL BACK
—babbitt lined

BRONZE BACK
—babbitt lined

CAST BRONZE

ALUMINUM ALLOY

LEDALOYL
—powder metallurgy

(*Continued from page* 82)

of the pilot who, on final approach, has $2 million worth of airplane and upwards of 95 human lives resting in his hands. The pilot, in flight, is comparable to a businessman operating a business with assets of $2 million and sales of about $10,000 daily.

Simplicity is Cost Saver

North American Aviation, the world's largest producers of airplanes, has revealed some of its cost-cutting methods as a guide for other aircraft manufacturers in a special report to the Air Force. Among typical examples are: the use of knurled-swaged rod ends, instead of conventional swaging, which is proving far cheaper and even better; relaxation of skin flushness tolerances in those areas of the airplane not in a critical airflow region; the use of long, extruded hinges for attachment of assemblies instead of conventional riveting, bolting or special fittings; the use of simplified packaging for purchased parts shipped in from outside; and die fabrication on a production-line basis, which has greatly increased die maker productivity. North American is using a "renegotiation" provision in its own contracts with its subcontractors and has progressively reduced the price of many items in reflection of the "learning curve" downward trend in production costs. The company also makes purchases of such basic items as rivets, drill bushings, etc., on a plant-wide basis rather than on the basis of individual procurement contracts from the services.

Separation—At Last

After more than three years of often-vitriolic argument, the Civil Aeronautics Board has published its "administrative separation of subsidy from total mail payments." The separation has been asked by the Congress in order to permit enactment of legislation but adjournment for the conventions prevented such action. The Board's study shows, for the first time, that the airmail subsidy this year will amount to about $46 million, which is considerably less than critics had argued. This total is made up of $26 million to Pan American's worldwide routes, $4.5 million to TWA, $3.5 million to Northeast Airlines, $2.5 million to Panagra, $2 million to Chicago & Southern and $5.5 million to other airlines. These figures represent only a small fraction of these lines' revenue for the year. For example, it is only nine per cent for TWA and 13 per cent for Pan American, and all airlines could now get along without such subsidy. However, its removal would force cancellation of new equipment programs for these lines and thus, says the Board, harm the national defense. The Board, abandoning its long attempts to obtain detailed figures on the direct airline cost of carrying the mail, made its study on the basis of an eight per cent net profit after taxes on the airline investment. Thus, the airlines provided an average ton-mile cost of operation which comes to 34.2¢ per ton-mile. The Board added the cost of traffic promotion and the eight per cent return, and came up with an average figure of 42¢ per ton-mile. This figure was multiplied by estimated ton-mile figures for each airline for the year and the subsidy figures thus obtained. The next step in the problem is not clear but the exact amount of subsidy for the major airlines now has been obtained and made available to the public.

Carts and Horses

After two years of intensive and expensive effort, the Air Force has

(*Turn to page* 88, *please*)

Proved IN MANY SERVICES

Lamb Electric

SPECIAL APPLICATION FRACTIONAL HORSEPOWER MOTORS

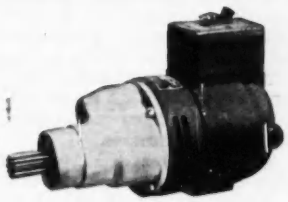
• Typical of the fields in which Lamb Electric Motors have gained a reputation for outstanding performance, are aircraft components, business machines, industrial and commercial equipment, household appliances, machine tools and portable electric tools.

Back of the good performance of Lamb Electric Motors is the fact that each motor is designed for a particular product or device, thereby insuring exact mechanical and electrical requirements.

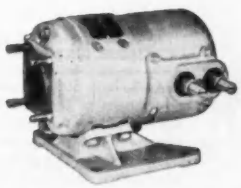
In addition to providing dependability, this *special engineering* usually results in savings in space, weight and cost factor.

The Lamb Electric Company
Kent, Ohio

THEY'RE POWERING
AMERICA'S *Finest* PRODUCTS



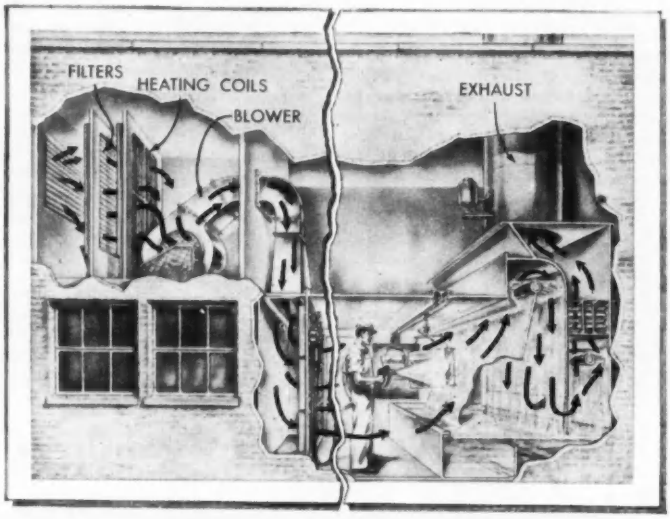
Geared head motor with reversing switch, adaptable to many heavy-duty, slow-speed applications.



Motor with high horsepower to low weight factor for either direct drive or use with external gear reduction.

Lamb Electric

SPECIAL APPLICATION FRACTIONAL HORSEPOWER MOTORS



A spray booth is only 1/2 the picture!

The efficient removal of paint and fume laden air from your spray painting department is of obvious importance. This is the job of Binks Dynaprecipitor Water-Wash Spray Booths. In these miniature Niagaras, overspray pigments and vehicles are washed from the air before it is exhausted outside. You can even collect the overspray pigments for reclamation if you wish to. No other spray booth does such an efficient air cleaning job.

But when air is exhausted from a spray painting department without replacing it, trouble begins. A partial vacuum is created...dust is drawn in...air movements become drafty and irregular...booths don't work correctly...production drops...rejects increase.

That's why Binks offers you, not just a good spray booth and exhaust system, but a balanced air supply system as well...one that brings in from outside the correct volume of fresh air and delivers it to the right area...clean, warm and without drafts and eddies. You get top performance from your booth; adequate air movement to meet all safety and health requirements, but not an excess, which would cause drift and waste of paint.

In short...with a Binks spray booth system you take fresh air from outside, put it to maximum use in your plant and then exhaust it outside again...clean and trouble-free.

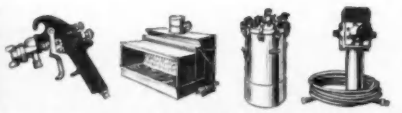
Please let us tell you more

Binks Bulletin 500, showing the operation and advantages of Dynaprecipitor Water-Wash Spray Booths, will be sent free to all requesting it. Or, better still, let a Binks Engineer call at your plant without obligation to discuss this or any other spray painting problem you may have.

Address: Binks Manufacturing Company, 3120-30 West Carroll Avenue, Chicago 12, Illinois.

Binks

EVERYTHING FOR SPRAY PAINTING



GUNS • SPRAY BOOTHS • MATERIAL TANKS • EXTRACTORS & ACCESSORIES

REPRESENTATIVES IN PRINCIPAL U. S. & CANADIAN CITIES • SEE YOUR CLASSIFIED DIRECTORY

(*Continued from page 87*)

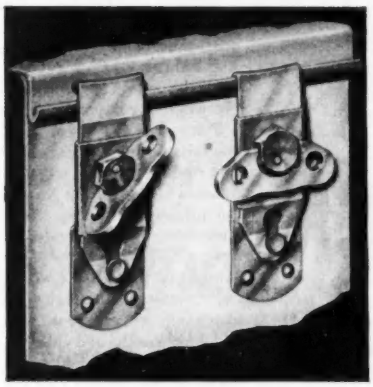
finally got the heavy forge press program well under way. The next problem, according to the Air Force, was to find something to put in the presses: a peculiar analogy to the old cart-before-the-horse fable. It seems that in order to utilize the upcoming 25,000- and 50,000-ton presses, aluminum alloy forge material ingots 32 in. in diameter were required, and the largest available were only 12 in. diam due to splitting and rupturing of the cast ingot. Now, however, 32-in. 75S aluminum alloy ingots have been cast successfully, thereby providing something for the new presses to forge. Because of its high strength, 75S has proved extremely difficult to cast in large ingot sizes because the ingot must be degassed and frozen quickly to avoid porosity, cracking and rupture.

Titanium Takes Off

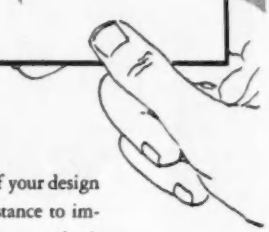
Titanium producers are singing the old refrain that it never rains but what it pours against the mounting deluge of demands for the metal. Aircraft manufacturers, after a cautious two years of laboratory tests on fabricating characteristics, have started specifying titanium alloy throughout their aircraft but—suppliers are not yet ready for such quantity orders. Lockheed is specifying titanium alloy in the empennage of the Constellation, Northrop is ready to use titanium alloy rivets, Convair is using heat-resistant titanium in missile design, McDonnell has a Navy contract for production of titanium-alloy arrestor gears for carrier fighters, and both Allison and Westinghouse are specifying titanium in their jet engines. Present demands are about 10 times the supply and the services are worried lest another bottleneck be in the making. Titanium Metals Corp. (owned jointly by Alleghany Ludlum and National Lead), and Remington Arms-Crucible Steel, working in a joint DuPont project, are the two major suppliers but, so far, the supply is only a trickle. Titanium Metals is committed to produce 10 tons daily and the DuPont project is working towards a capacity of 2½ tons per day. Current going price for titanium sheet is $15.00 per lb while forging and bar stock is only $6.00 per lb. A dozen other suppliers now are getting into the market and it seems certain that all of the much-publicized promises of the "wonder metal" are going to be realized in the next few years.

Have you a similar fastening problem?

File: Simmons LINK-LOCK



When the armed forces needed a positive, high-strength fastening device for instrument housings, transit cases, and storage boxes, Simmons developed LINK-LOCK. This *brand-new* device doesn't use springs, yet works with fingertip pressure through a unique mechanical arrangement: the vertical sliding latch is moved in and out of locking position by a disc rotated with a wing nut. The fastener is immune to low temperatures, is easy to operate even with arctic mittens, furnishes up to 450-lb. pull-down pressure. Open or closed, it lies flat against the side of the case it fastens.



LINK-LOCK may be the answer to your fastening problem. If your design involves heavy fastening pressures, watertight sealing, high strength, resistance to impact, ask about LINK-LOCK. Simmons can furnish it with special engagement-latch details, or for operation by bolt or screwhead instead of wing nut. Write for LINK-LOCK DATA SHEET today. It gives complete details and dimensions. A Simmons engineer will be glad to work with you on your fastening problems.

SIMMONS FASTENER CORPORATION, 1749 No. Broadway, Albany 1, New York

Simmons

LINK-LOCK
QUICK-LOCK
SPRING-LOCK
ROTO-LOCK

FASTENERS WITH USES UNLIMITED

French Automobile Industry

(*Continued from page 74*)

amount was distributed among the workers. The sum of $112,500 was carried to the legal five per cent reserve, $125,000 went to a special reserve, and $17,549 was carried forward.

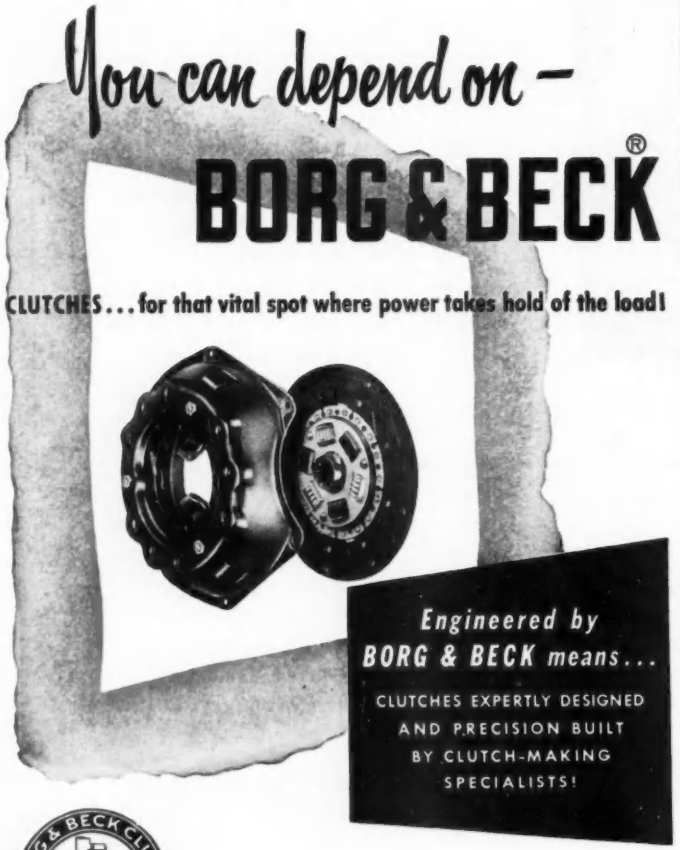
The year showed a tightening of markets, particularly foreign. Exports to the French Overseas Union increased a little, but total exports dropped from 34.4 per cent to 30.9 per cent of the total production.

Outstanding of the year's activity is the move from the original factory at Billancourt, on the edge of Paris, to a new factory at Flins, 20 miles to the west of the city. There were 600 new machine tools purchased and an equal number of machines modified. Approximately 420 standard and special machine tools have been built in the Renault works, 21 of these being circular transfer machines and 39 of the straight line type.

In his annual report, Pierre Lefaucheux, emphasizes Renault's tendency to use more and more products of private enterprise. Two new trucks are fitted with Hercules Diesel engines built in France by Hispano-Suiza and parts of the English Perkins Diesel are imported. Parts purchased from private enterprise now include headlamps, spark plugs, generators, starters, shock absorbers, clutches, and steering gears, these last being manufactured outside under Gemmer license. All tools for agricultural tractors are bought outside. Important contracts have been placed with private industry for machining operations and for body pressings. The Vandervell thin wall bearings are being produced in conjunction with the English company.

Pierre Lefaucheux states that these specialists possess the skilled engineers and the plants enabling them to produce better and at lower cost than the automobile factory. He extolls the American system, under which, he states, 90 per cent of the smaller specialized firms are healthy, for they have the technical staffs, the laboratories, the experimental departments and the specialized plants enabling them to produce in big quantities at lower prices than is possible for the automobile manufacturer.

It is revealed in the report that Renault has completed the production of an experimental locomotive equipped with a gas turbine driven by a free piston generator of 1000 hp. Fuel oil consumption is said to be 0.44 lb per hp-hr. It is claimed that this is the first free piston gas turbine locomotive to be built, and results indicate important industrial developments.



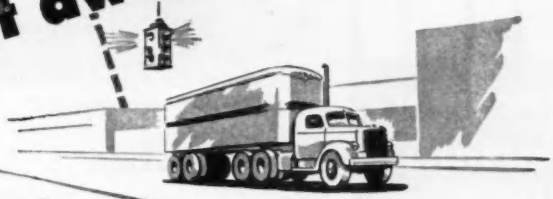
Readers of

AUTOMOTIVE INDUSTRIES

are always well informed

First up . . .

First away . . .



10 speeds forward

without gear splitting

You'll think there is a "souped up" engine under the hood the first time you drive a big rig equipped with a Fuller ROADRANGER. For this transmission really puts horsepower to work.

Gear-splitting is entirely *eliminated.* Shifts are simple, short, and fast, with only one power shift in the whole series. Yet you have 10 forward speeds—available in *equal,* progressive, selective steps, none exceeding 28%—to keep your engine *always* turning in its most efficient range.

With this transmission, there's no more engine lugging, no more low rpm between shifts. With the Fuller ROADRANGER, you can haul more, and maintain higher average speeds than ever before—with so much better utilization of horsepower that you make ¼ fewer shifts.

Ask the man who has driven one. He'll tell you that with *one lever controlling 10 speeds,* he's always *first* up the steep grade, *first* away in city traffic. Write today for full information on the new Fuller ROADRANGER.

Fuller Roadranger

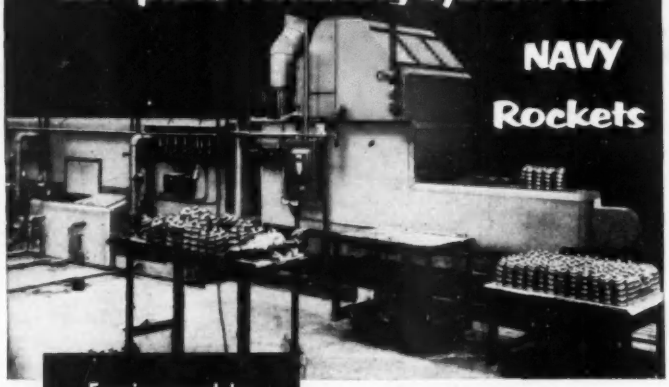
You shift 1-2-3-4-5 with the new *Fuller* ROADRANGER *Transmission.* Then, you push or pull the range selector button, shift through neutral and go right back through the series for 6-7-8-9-10. Yes, 10 speeds forward with no gear splitting. Straight shifts all the way. That's the *Fuller* ROADRANGER.

Fuller TRANSMISSIONS

FULLER MANUFACTURING COMPANY (Transmission Division), KALAMAZOO 13F, MICHIGAN

Unit Drop Forge Division, Milwaukee 1, Wis. • WESTERN DISTRICT OFFICE (SALES & SERVICE—BOTH DIVISIONS), 1060 E. 11th Street, Oakland 6, Calif.

Complete Finishing System for NAVY Rockets



Cleaning and Bonderizing Machine

Engineered by
Cincinnati
CLEANING and FINISHING MACHINERY COMPANY

at the
U.S. NAVAL INDUSTRIAL RESERVE ORDNANCE PLANT
operated by
UNITED STATES HOFFMAN MACHINERY CORPORATION
Poughkeepsie, N.Y.

EIGHT OPERATIONS

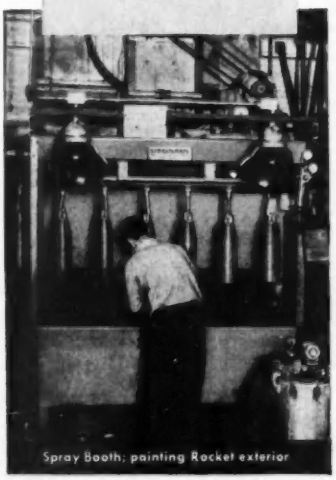
1. Wash
2. Rinse
3. Bonderite
4. Cold Rinse
5. Chromic Rinse
6. Hot Air (Fan) Blowoff
7. Paint Cavity
8. Prime Paint Outside

CINCINNATI engineered, this complete finishing system for Navy Rockets includes a two booth paint finishing system, a Bonderizing machine and belt and monorail conveyors.

In order to successfully clean these hollow units, CINCINNATI Engineers provided an inclined conveyor belt through the washing and Bonderizing machine. This assures complete cleaning, draining and drying of the parts. A separate spray booth with a time-saving inside spraying mechanism was also installed.

With a minimum of adaption this CINCINNATI installation could handle a great variety of parts. Other representative installations have shown savings of up to 75% in time and cost.

Write for your copy of the latest CINCINNATI Catalog today.



Spray Booth; painting Rocket exterior

Cincinnati
CLEANING & FINISHING MACHINERY COMPANY
315 Hecla Street
Ironton, Ohio

Single Oil System

(*Continued from page 47*)

plate between the torque converter housing and cylinder block delivers oil from the gallery to the periphery of the torque converter housing. Oil then flows through passages in the outside and rear of the torque converter housing to a hole in the stator reaction shaft. From here oil flows through an annular space between the turbine drive shaft and reaction shaft to drilled passages in the reaction shaft, providing entry into the torque converter assembly.

From the torque converter, oil flows into a hollow passage in the drive shaft past a ball-type pressure regulating valve The. latter maintains an oil pressure of 20 psi in the torque converter. It also serves to prevent rapid draining when the engine is not running. A 3/32 in. diameter flow restriction orifice in the turbine shaft limits oil flow into the annular cavity between the flange at the end of the reaction shaft and the turbine shaft bearing. By thus limiting oil flow, the orifice prevents starving of the engine.

Oil flows from the annular cavity mentioned above, and through the torque converter housing and adapter plate to the engine. Within the engine oil is discharged downward through a tube to a point below the oil level in the crankcase sump to prevent frothing as well as to condense oil vapors leaving the converter.

"O" ring seals are used for the oil passages at the engine block to the adapter plate and adapter plate to the converter housing. Two seals also are used between the stator reaction shaft and turbine drive shaft to direct all of the incoming oil through the blades of the converter, so as to maintain proper cooling.

An internal by-pass oil pump is provided in the engine to supply both engine and torque converter requirements. This type of pump is non-frothing, and supplies approximately two quarts of oil per minute to the torque converter.

AUTOMOTIVE INDUSTRIES . . .

is your News Magazine of Automotive and Aviation

MANUFACTURING

The happy little Eskimo has POWER STEERING ...why not modern trucks?

"The happy little Eskimo,
He rides upon his sled.
His dogs outstrip the winds that blow
Across the gleaming ice and snow
Beneath the northern lights that glow
Like silver overhead."

Words of song by Frederick Manley.
© Silver Burdett Co., by permission.

As the dog team rushes the sled along, the animals furnish the power for steering. The Eskimo just shouts the arctic equivalent of "gee" or "haw" and the dogs turn the sled accordingly. The Eskimo doesn't have to wrench a steering wheel.

Even when "gleaming ice and snow" are with us, we don't use sleds for transport. But in eliminating primitive haulage, we have lost the power steering. The far heavier manual steering load is on the arm, shoulder and back muscles of the driver. The resulting fatigue causes him to slow down, become less efficient, more prone to accidents.

Vickers Hydraulic Power Steering makes the heaviest vehicle safe and almost effortless to steer . . . even under the most adverse conditions (ruts, soft shoulders, obstructions, flat tires, off-road, etc.). A light finger touch on the wheel is enough . . . steering is no longer a source of driver fatigue. Drivers remain fresh, efficient, safe.

Get further information on Vickers Hydraulic Power Steering; ask for Bulletin M-5100.

VICKERS Incorporated
DIVISION OF THE SPERRY CORPORATION
1428 OAKMAN BLVD. • DETROIT 32, MICH.

Application Engineering Offices: **ATLANTA • CHICAGO (Metropolitan) CINCINNATI • CLEVELAND • DETROIT • HOUSTON • LOS ANGELES (Metropolitan) NEW YORK (Metropolitan) • PHILADELPHIA • PITTSBURGH • ROCHESTER ROCKFORD • ST. LOUIS • SEATTLE • TULSA • WASHINGTON • WORCESTER**

VICKERS hydraulic POWER STEERING
Is Effortless, Positive and Shockless

4878

The UCHTORFF

NEW 600 TON METAL DRAWING LAKE ERIE HYDRAULIC PRESS

in the Uchtorff plant

"We are proud of this press," says Mr. A. F. Uchtorff, president of the company. "Our customers and prospects are pleased too for now they have efficient metal forming facilities nearby for large pieces as well as the smaller ones formed on our original press. Our Lake Erie presses are saving time and money for our clients."

● Repeat orders are the rule at Lake Erie

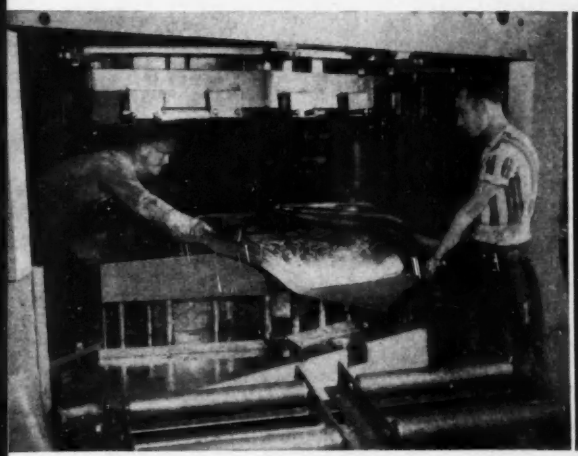
Being so satisfied with your first Lake Erie press that you soon want another is typical. It is the recorded experience of hundreds of leading plants...the best evidence in the world of the production improvements you can count on with Lake Erie hydraulic equipment.

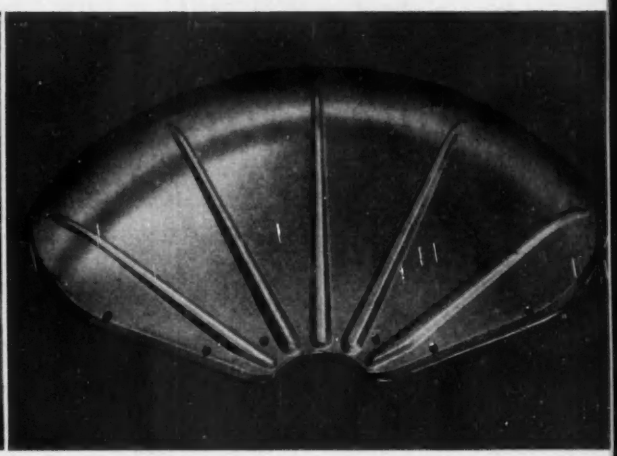
Success Story...

...another tribute to versatile

LAKE ERIE HYDRAULIC PRESSES

"Satisfy the customer's need," is the successful policy of The Uchtorff Company, Davenport, Iowa. In selecting Lake Erie Hydraulic Presses for their plant, Uchtorff acquired ideal equipment for this purpose. The first press quickly attracted and built-up a profitable volume of business. The second, and bigger press, is greatly expanding it in the farm implement, tractor and other fields requiring large drawn and formed parts. Versatile . . . fast . . . dependable . . . and efficient, Lake Erie Hydraulic Presses are "satisfying customer's needs" in hundreds of leading plants today. The newest presses are setting unmatched production records for a surprising variety of metal forming jobs. Why not ask us about these applications for your plant? Glad to have you. No obligation. Write or phone.





● New 600 ton press with 200 ton hydro-pneumatic die cushion is shown forming hood wrapper for farm harvester. Piece is formed out of 22 gage deep draw steel and measures 34½" side to side by 48" top to bottom. Depth of draw is 5". Tonnages employed on this job are 400 on top platen and 100 on die cushion. Other typical parts formed on the Lake Erie presses are farm tractor fenders, farm tractor engine oil pans, farm plow depth gauge wheels and farm tractor engine valve covers. The unusual speed with which dies can be set up or changed is another important production advantage of Lake Erie hydraulic equipment.

LAKE ERIE
ENGINEERING CORP.
BUFFALO, N.Y. U.S.A.

LAKE ERIE ENGINEERING CORP.

MANUFACTURERS OF
HYDRAULIC PRESSES AND SPECIAL MACHINERY

General Offices and Plant:

509 Woodward Avenue, Buffalo 17, New York

LAKE ERIE HYDRAULIC PRESSES are available in any size . . . standard, modified and special designs—horizontal and vertical types—for Metal Working—Plastics Molding—Forging—Metal Extrusion—Processing—Vulcanizing—Laminating—Stereotype Molding—Die Casting—Briquetting—Baling—Special Purpose.

DISTRICT OFFICES IN NEW YORK, CHICAGO and DETROIT
Representatives in Other Principal Cities in the United States and Foreign Countries
Manufactured in Canada by: Canada Iron Foundries Limited

LAKE ERIE ®

"Producing the very finest hydraulic machinery possible to help manufacturers produce more efficiently"

C/R

THE SEAL OF COOPERATIVE RESEARCH

For absolutely dependable mechanical leather parts you need

SIRVIS

The cooperative research and engineering services which C/R has provided in producing special Sirvis leather parts for leading manufacturers, are also available to you. We will be pleased to send you any further information you wish. Catalog on request.

C/R SIRVIS

MECHANICAL LEATHER PRODUCTS

SIRVIS DIVISION

SIRVENE
Scientifically Compounded Elastomer

Custom-engineered and custom-built for critical service in aircraft, automotive and other mechanisms.

PERFECT Oil Seals

C/R seals are used in more motor vehicles, farm implements and industrial machines than any other shaft-type sealing device.

Representatives in these Principal Cities

Boston • New York • Syracuse
Philadelphia • Pittsburgh • Cincinnati
Cleveland • Detroit • Peoria
Minneapolis • Kansas City • Houston
Los Angeles • San Francisco

New Defense Facilities

SUPPLEMENTING the list of Certificates of Necessity issued up to June 24 authorizing new or expanded defense plant facilities for the manufacture of automotive and aviation war goods which were published in the July 15 issue, page 126, of AUTOMOTIVE INDUSTRIES, the following additional certificates were announced by the Defense Production Administration between June 24 and July 21.

Included in this latest tabulation, 12,270 new or expanded defense facilities of all types have been authorized for rapid tax write-off, the total amount eligible for amortization being $20,924,061,494. These figures are exclusive of cases that are up for later review but included in this list —in these cases no dollar amount is listed. The figure appearing in parentheses is the percentage authorized for actual fast tax write-off.

—A—

Acme Aluminum Foundry Co., Chicago, Ill.
Magnesium castings—$47,375 (50)

Adams Stamping Corp., Newark, N. J.
Aircraft & ordnance parts—$262,657 (35)

Ajax Iron Works, Corry, Pa.
Internal combustion engines—$243,241 (50)

American Phenolic Corp., Chicago, Ill.
Aircraft parts—$334,144 (65)

American Tool & Die Co., Los Angeles, Calif.
Aircraft parts—$6,111 (70)

Archer Machine Products Co., Los Angeles, Calif.
Aircraft parts—$136,726 (50)

Armstrong Furnace Co., Des Moines, Iowa
Aircraft parts—$79,890 (65)
Aircraft parts—$66,390 (65)

Art Supply & Instrument Co., Inc., New York, N. Y.
Aircraft parts—$11,525 (70)

—B—

B & Y Machine Co., Los Angeles, Calif.
Aircraft parts—$22,391 (70)

Baldwin-Lima-Hamilton Corp., Lima, Ohio
Powered shovels, cranes & draglines —$664,578 (50)

Beech Aircraft Corp., Wichita, Kans.
Aircraft & parts—$39,365 (65)

Bendix Aviation Corp., Pacific Div., North Hollywood, Calif.
Hydraulic cylinders—$72,500 (40)

Bill Jack Scientific Instrument Co., Solana Beach, Calif.
Aircraft components—$67,817 (50)

Bloomfield Machine Co., Bloomfield, Conn.
Aircraft parts—$6,920 (70)

Boeing Airplane Co., Seattle, Wash.
Aircraft and parts—$76,875 (65)

Bohn Aluminum & Brass Corp., Detroit, Mich.
Components for military end items—$90,500 (50)

Bohn Aluminum & Brass Corp., Hamtramck, Mich.
Aircraft parts—$336,000 (65)

Brake Industries, Inc., Ferndale, Mich.
Aircraft parts—$9,152 (80)

The Budd Co., Detroit, Mich.
Ordnance—$506,660 (65)
Ordnance—$50,967 (65)

(*Turn to page 98, please*)

JOHNSON *Tappets*

are made by Tappet Specialists

Thorough and complete attention by the entire Johnson Tappet organization to these important working parts of your engines assure you of maximum tappet life and performance.

SELF LOCKING TAPPET SCREW

Originated by Johnson this diaphragm type Self Locking Tappet Screw is operating successfully in millions of cast iron and steel tappets.

"Tappets Are Our Business"

JOHNSON JP PRODUCTS INC.

MUSKEGON, MICHIGAN

CLARK EQUIPMENT

CRACKS DOWN on costs all along the line —

Here's efficiency . . . loads of it.

Whether one item constitutes a load; whether several items are combined to make a unit load, or whether, as in the case of most materials, they can be assembled into a palletized load . . . here's the modern method of handling it.

From receiving to shipping . . . all along the line . . . Clark equipment puts materials handling on a "save-as-you-go" basis. Clark Fork Trucks lift, carry, tier anything in cartons, barrels, bags, boxes, crates or drums. They stack unit loads to ceiling height . . . easily . . . effortlessly . . . multiplying your storage space without adding to your costs. Materials, parts, finished products are moved from one operation to another without delay . . . and with a minimum of manpower. And the extra expense items of demurrage, accident and damage losses show a remarkable reduction when Clark equipment is on the job.

There's a Clark unit for every handling operation from receiving to shipping . . . each one engineered and built for long life and efficient operation. Let us show you how they can improve your operation and crack down on costs.

CLARK ELECTRIC AND GAS POWERED FORK TRUCKS
AND POWERED HAND TRUCKS • INDUSTRIAL TOWING TRACTORS

INDUSTRIAL TRUCK DIVISION • CLARK EQUIPMENT COMPANY • BATTLE CREEK 68, MICHIGAN

Please send: ☐ Material Handling News ☐ Basic Facts ☐ Movie Digest ☐ Have Representative Call

Name_____

Firm Name_____

Street_____

City_____ Zone____ State_____

AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS

(*Continued from page 97*)

Burton Mfg. Co., Los Angeles, Calif.
Aircraft parts—$5,721 (70)

—C—

C & L Precision, Inc., Stamford, Conn.
Aircraft parts—$10,623 (40)
Carter Carburetor Corp., St. Louis Co., Mo.
Ordnance—$1,350,000 (45)
Cheshire Products, Inc., Hamden, Conn.
Aircraft parts—$33,617 (60)
Chicago Cutting Die Co., Chicago, Ill.
Aircraft parts—$65,523 (40)
Colish Iron Works, Inc., Hawthorne, N. J.
Airplane engine testing—$55,008 (65)
Commercial Steel Treating Corp., Detroit, Mich.
Heat treating of metals for aircraft—$10,891 (70)
Configured Tube Products Co., Chicago, Ill.
Aircraft parts—$5,024 (70)
Continental Can Co., Inc., Seattle, Wash.
Aircraft parts—$40,000 (65)
Curtiss-Wright Corp., Buffalo, N. Y.
Aircraft components—$1,750,000 (40)

—D—

F. W. Derbyshire, Inc., Waltham, Mass.
Components for machine tools—$4,480 (70)
Douglas Aircraft Co., Inc., Santa Monica, Calif.
Aircraft parts—$442,957 (60)
The Dow Chemical Co., Bay City, Mich.
Aircraft magnesium castings—$660,000 (65)

—E—

Economy Screw Machine & Metal Products Mfg. Co., New York, N. Y.
Aircraft parts—$10,447 (70)
Elastic Stop Nut Corp. of America, Union, N. J.
Precision fasteners—$60,618 (65)
Precision fasteners—$214,962 (65)
The Electric Furnace Co., Salem, Ohio
Heat treating furnaces—$159,200 (55)
Electro-Chemical Engraving Co., Inc., New York, N. Y.
Aircraft parts—$67,701 (70)

—F—

F. & W. Manufacturing Co., Inc., New York, N. Y.
Aircraft parts—$51,354 (45)
Federal-Mogul Corp., St. Johns, Mich.
Components—$145,870 (65)
Fenn Mfg. Co., Newington, Conn.
Aircraft parts—$1,981,835 (30)
The Flour City Ornamental Iron Co., Minneapolis, Minn.
Aircraft parts—$10,932 (70)
R. H. Freitag Mfg. Co., Akron, Ohio
Aircraft parts—$538,554 (55)

(*Turn to page 102, please*)

A few words about

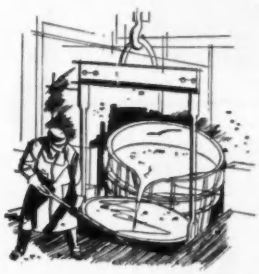
GRAINAL ALLOYS

and how they are

Metallurgically Engineered

to produce greater uniformity in your boron treated steels

In our Laboratories every aspect of Grainal Alloys is carefully studied.



In our Plant exacting methods of production protect the quality of Grainal Alloys.

In your Mill, greater uniformity in your boron steels.

Uniformity. Consistent Results.

These are the demands of today's steelmaker. To make certain they are answered, we have *metallurgically engineered* our Grainal alloys.

In our laboratories, in our plant, every care is taken to insure a product of the correct composition and highest quality.

Result: A uniform product that enables you to produce steels of consistently high hardenability. And note—with Grainal you achieve this result with a minimum boron addition.

VANADIUM CORPORATION OF AMERICA

VANCORAM

MAKERS OF ALLOYS, CHEMICALS AND METALS

420 Lexington Avenue, New York 17, N. Y.
Detroit • Chicago • Cleveland • Pittsburgh

NIAGARA

SERIES B
GAP FRAME Double Crank Presses

Niagara B-4 x 72 Press at the General Machine Works in Los Angeles. It is shown here fitted with two dies for forming operations on an automatic deflector.

The same press as shown above arranged with dies for redrawing projectile parts in 5 steps. Shells are transferred manually from die to die.

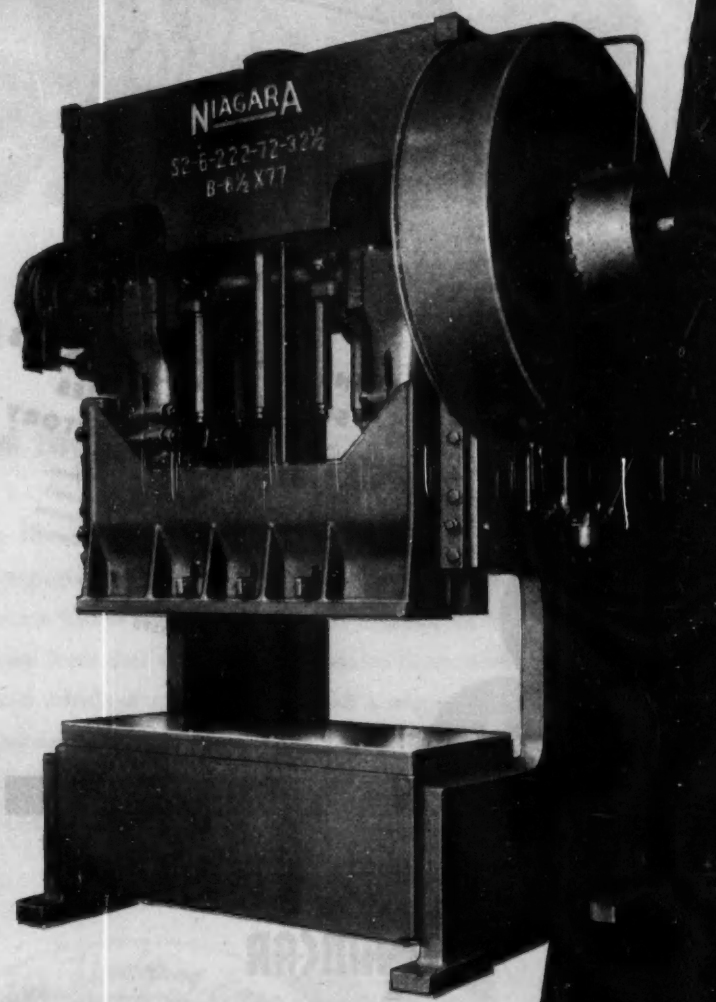
NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

Manufacturers of a complete line of sheet metal working equipment ranging from small hand tools up to large power operated machinery.

Versatility and High Production

- Gap frame convenience with double crank width.
- Ideal for long progressive dies or multi-station dies.
- Rear of press open for full accessibility.
- One piece welded steel frame for maximum rigidity and long die life.
- Exclusive Niagara Sleeve Clutches for maximum productive strokes per minute and minimum maintenance cost.
- Niagara cushions for drawing operations.
- Automatic feeds for high production jobs.

Write for Bulletin



Niagara B-6½ x 77 Gap Frame Double Crank Press. Air actuated, electrically controlled sleeve clutch with friction clutch convenience and sleeve clutch economy. Air releasing brake. Clutch and gearing operating in a bath of oil. Air counterbalance for slide with surge tank over-size cylinder and pressure regulating valve to compensate for various weights of dies. Cross bar knockout in slide. V-belt motor drive.

DISTRICT OFFICES: NEW YORK • CLEVELAND • DETROIT • PHILADELPHIA

CAMCAR helps you

raise your sights on fastener supply! *

by combining

ENGINEERING EXPERIENCE
SPECIAL TOOLING SKILLS
PRODUCTION FACILITIES
CONTINUOUS INVENTORY

Be sure you get the maximum in close tolerances, structural design and prompt high-volume supply. Camcar guarantees this quality through Special Tooling Methods and Selective Machine Control.

STANDARDS • SPECIALS
A.N. SCREWS — BOLTS
THREAD CUTTERS
SHEET METAL
PHILLIPS HEAD
SEMS

Write for Your Copy of
"A NEW STANDARD IN FASTENER SUPPLY"

When You Need Fasteners or Special Metal Parts...
TELEPHONE 3-9451 or TELETYPE RK-53

CAMCAR

SCREW & MFG. CORP.
606 EIGHTEENTH AVE., ROCKFORD, ILL.

"PRODUCTION-DESIGNED FOR YOUR ASSEMBLY LINE"

(*Continued from page* 98)

—G—

G. T. K. Corp., East Hartford, Conn.
Aircraft parts—$46,610 (70)

Gar Wood Industries, Inc., Wayne, Mich.
Ordnance—$66,718 (75)

The Gates Rubber Co., Denver, Colo.
Tires—$52,590 (25)

General Fireproofing Co., Youngstown, Ohio
Aircraft parts—$800,000 (40)

General Motors Corp., Dayton, Ohio
Ordnance—$247,789 (50)

General Motors Corp., Harrison, N. J.
Roller bearings—$180,620 (40)
Roller bearings—$510,112 (65)

General Motors Corp., Indianapolis, Ind.
Aircraft components—$5,101,500 (45)

General Motors Corp., Rochester, N. Y.
Aircraft parts—$153,630 (65)

General Tire and Rubber Co., Calvert City, Ky.
Vinyl resins—$5,319,000 (45)

B. F. Goodrich Co., Calvert City, Ky.
Vinyl resins—$5,871,100 (45)

The Goodyear Tire & Rubber Co., St. Marys, Ohio
Aircraft parts—$60,175 (65)

Gruman Aircraft Engineering Corp., Bethpage, L. I., N. Y.
Military aircraft—$53,615 (70)

—H—

Holsman Mfg. Co., Cleveland, Ohio
Aircraft parts—$17,171 (65)

Huck Mfg. Co., Macomb Co., Mich.
Precision fasteners—$1,405,000 (30)

—I—

The International Silver Co., Meriden, Conn.
Magnesium alloy castings—$29,901 (65)

—J—

F. L. Jacobs Co., Detroit, Mich.
Ordnance—$25,200 (75)

—K—

Kalamazoo Stove & Furnace Co., Kalamazoo, Mich.
Aircraft parts—$51,915 (65)

The Kaydon Engineering Corporation, Muskegon, Mich.
Bearings—$86,060 (65)

The Kratz Corp., St. Louis, Mo.
Aircraft parts—$22,459 (70)

—L—

L C N Closers, Inc., Princeton, Ill.
Aircraft parts—$30,000 (40)

Lear, Inc., Los Angeles, Calif.
Control systems for aircraft—$3,715 (75)

The Leece-Meville Co., Cleveland, Ohio
Ordnance—$22,962 (65)

(*Turn to page* 105, *please*)

Spicer

SPECIALISTS IN SERVICE

Spicer Clutch Quality...

has served the quality truck field since 1911

Spicer and Spicer Brown-Lipe Clutches have been an integral part of the revolution in transportation which the truck has brought to the world. The first Brown-Lipe Clutch for truck service was shipped on March 10, 1911. The transition from that period of the plodding horse, to the swift-moving commercial vehicle of today, has taken but a relatively few years. The vision, genius and untiring efforts of the automotive industry have helped shape this modern miracle. And into it has gone endless thousands of Brown-Lipe Clutches of Spicer quality . . . *Standard of the Industry.*

Spicer

SPECIALISTS IN SERVICE

Spicer
BROWN-LIPE CLUTCH

keeps things moving when the trucking is rough

Spicer Brown-Lipe Clutch service is measured in terms of years, operating under every condition of truck service encountered in the industry. Special features include:

UNIFORM OVERALL PRESSURE. Through 360° of pressure plate.

SIMPLE SCREW THREAD ADJUSTMENT. Permits quick, easy adjustment.

LONGER BEARING LIFE. Completely shielded release bearing.

NON-WARPING PRESSURE PLATE. Made of heat treated alloy.

SMOOTH. Flexibility of levers results in smooth pick-up.

NO CHATTER. Assures longer life.

LOW PEDAL PRESSURE. Remains essentially constant throughout clutch life.

FEWER PARTS. Greater efficiency with less upkeep.

INSULATED SPRINGS. Heat from plate cannot destroy their temper.

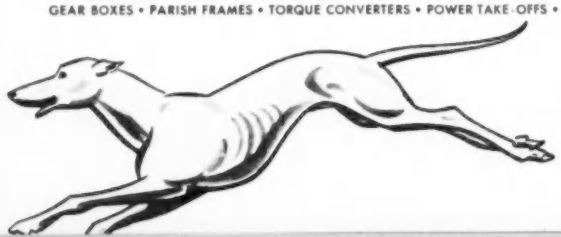
ECONOMICAL. Delivered completely engineered—not necessary to design or purchase special transmission front bearing caps, clutch release bearings or housings.

48 YEARS OF Spicer SERVICE

SPICER MANUFACTURING

Division of Dana Corporation • **TOLEDO 1, OHIO**

TRANSMISSIONS • UNIVERSAL JOINTS • BROWN-LIPE AND AUBURN CLUTCHES • FORGINGS • PASSENGER CAR AXLES • STAMPINGS • SPICER "BROWN-LIPE" GEAR BOXES • PARISH FRAMES • TORQUE CONVERTERS • POWER TAKE-OFFS • POWER TAKE-OFF JOINTS • RAIL CAR DRIVES • RAILWAY GENERATOR DRIVES



(*Continued from page* 102)

Lockheed Aircraft Corp., Burbank, Calif.
Aircraft and spare parts—$2,192,616 (60)

Lovejoy Tool Co., Inc., Springfield, Vt.
Components for machine tools—$17,757 (65)

— M —

M. C. Manufacturing Co., Lake Orion, Mich.
Aircraft parts—$45,000 (45)

Maks Machine Co., Detroit, Mich.
Aircraft parts—$17,130 (70)

Mansfield Tire & Rubber Co., Mansfield, Ohio
Tires—$148,900 (55)

Mar Vista Engineering Co., Los Angeles, Calif.
Aircraft parts—$270,526 (70)

Marion Screw Products Co., Marion, Ind.
Aircraft parts—$14,925 (70)

Media Machine Works, Inc., Media, Pa.
Aircraft parts—$24,000 (45)

Mendelson-McCarthy Co., Long Beach, Calif.
Aircraft parts—$50,000 (70)

Theodore J. Menton, Baldwin, N. Y.
Aircraft parts—$10,597 (65)

Metal Improvement Co., Los Angeles, Calif.
Aircraft parts—$25,052 (40)

Model Engineering & Mfg., Inc., Huntington, Ind.
Aircraft parts—$18,503 (65)

Moore Tool Works, North Hollywood, Calif.
Aircraft parts—$29,633 (45)

The Murray Ohio Mfg. Co., Cleveland, Ohio
Ordnance—$249,418 (65)

— N —

National Heat Treating Co., Los Angeles, Calif.
Aircraft parts—$14,700 (50)

The New York Air Brake Co., Watertown, N. Y.
Aircraft parts—$159,570 (60)

Northeast Tool & Engineering Co., Springfield, Hampden, Mass.
Forgings—$38,400 (65)

— O —

The Oliver Corp., Cleveland, Ohio
Ordnance—$1,435 (65)

— P —

Pacific Airmotive Corp., Burbank, Calif.
Aircraft parts—$28,225 (65)

Parker Rust Proof Co., Maywood, Calif.
Chemicals casting—$10,814 (45)

Parker Rust Proof Co., Morenci, Mich.
Chemical coating compound—$36,730 (40)

(*Turn to page* 106, *please*)

(*Advertisement*)

AMERICAN CHEMICAL PAINT COMPANY

AMBLER CHEMICALS ACP PROCESSES PENNA.

Technical Service Data Sheet

Subject: HOW TO MAKE PAINT STICK TO GALVANIZED IRON WITH LITHOFORM®

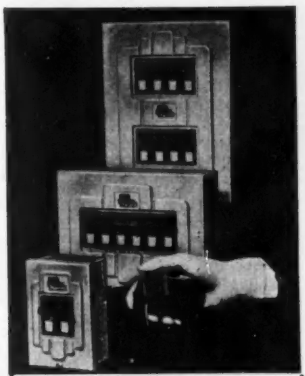
INTRODUCTION

"Lithoform" forms a dense, zinc phosphate coating on zinc, cadmium, and galvanized surfaces—including Galvanneal, cadmium plated steel, zinc plated steel, zinc base alloys, and zinc base die castings. The "Lithoform" coating, which is non-metallic and inactive, retards reaction between alkaline metal oxide and the paint film. Peeling and loss of adhesion are thus greatly retarded on painted Lithorized zinc and cadmium.

ADVANTAGES OF "LITHOFORM"

"Lithoform" forms a durable bond for paint. It is economical. It eliminates frequent repainting. It protects both the paint finish and the metal underneath. "Lithoform" meets these Government Finish Specifications:

QQ-P-416
RR-C-82
MIL-E-917A (Ships)
JAN-F-495
AN-F-20
U.S.N. Appendix 6



Photograph by courtesy of Murray Manufacturing Corp.
Murray Circuit Protectors are fully magnetic and provide maximum protection for both domestic and industrial wiring. Housings are of galvanized iron which is Spray Lithorized for long paint life.

THE LITHORIZING PROCESS

"Lithoform" can be applied by brushing or spraying the work with simple hand equipment, by dipping it in tanks, or by spraying it in industrial power washers.

Brush. Galvanized bay windows, cornices, rain gutters, hardware, building siding, truck panels, and farm equipment are typical of the many surfaces that are treated effectively with Brush "Lithoform".

Dip. This grade is used for coating cleaned surfaces of such typical products as cabinets, refrigeration condensers, etc., immersed in heated solutions in tanks.

Spray. The spray process is the most logical one with which to coat sheets, coiled strip or duplicate products best processed on a conveyor.

CHEMICALS ACP PROCESSES **WRITE FOR FURTHER INFORMATION ON "LITHOFORM" AND ON YOUR OWN METAL PROTECTION PROBLEMS.** CHEMICALS ACP PROCESSES

(*Continued from page* 105)

Pittsburgh Screw & Bolt Corp., Pittsburgh, Pa.
Precision fasteners—$414,053 (65)
Pittsburgh Steel Co., Allenport, Pa.
Rocket tubing—$78,000 (65)
Portland Forge & Foundry Co., Portland, Ind.
Aircraft forgings—$179,964 (65)
Pottstown Plating Works, Inc., Pottstown, Pa.
Aircraft parts—$12,022 (70)
Products Design & Mfg. Corp., Newington, Conn.
Aircraft parts—$40,464 (70)

—Q—

Quality Tool & Machine, Akron, Ohio
Aircraft parts—$10,175 (65)

—R—

Radio Mfg. Co., Fenton, Mich.
Aircraft parts—$11,260 (70)
Redford Lathe Turning Co., Detroit, Mich.
Aircraft parts—$33,770 (60)
Reo Motors, Inc., Lansing, Mich.
Ordnance—$49,764 (65)
Rocket Jet Engineering Corp., Glendale, Calif.
Aircraft parts—$9,075 (70)

—S—

Safe Flight Instrument Corp., White Plains, N. Y.
Aircraft parts—$5,823 (65)
Sequoia Metalcraft Co., San Carlos, Calif.
Aircraft parts—$23,740 (50)
Scintilla Magneto Div., Bendix Aviation Corp., Sidney, N. Y.
Aircraft parts—$49,170 (65)
Scott-Atwater Mfg. Co., Minneapolis, Minn.
Aircraft parts—$35,916 (70)
Smith Heat Treating Co., Los Angeles, Calif.
Aircraft & ordnance parts—$15,589 (70)
Spray Engineering Co., Somerville, Mass.
Jet engine parts—$5,450 (65)
Strongman Machine Co., Burbank, Calif.
Aircraft parts—$25,200 (60)
Superior Mfg. & Instrument Corp., Flushing, N. Y.
Jet engine parts—$8,225 (80)

—T—

Thompson Products, Inc., Cleveland, Ohio
Aircraft parts—$270,000 (65)
Thurman Machine Co., Columbus, Ohio
Ordnance and aircraft parts—$43,553 (70)
Towle & Son Co., Philadelphia, Pa.
Aircraft parts—$1,586 (70)
Townsend Co., New Brighton, Pa.
Aircraft parts—$159,500 (65)

—U—

U. S. Propellers, Inc., Pasadena, Calif.
Aircraft parts—$103,200 (60)
United States Rubber Co., Detroit, Mich.
Ordnance—$19,217 (25)
U. S. Testing Co., Inc., Hoboken, N. J.
Aircraft parts—$17,500 (70)
Universal Products Co., Inc., Dearborn, Mich.
Ordnance parts—$225,558 (70)

—V—

Vickers, Inc., Detroit, Mich.
Technical & scientific equipment—$30,000 (40)

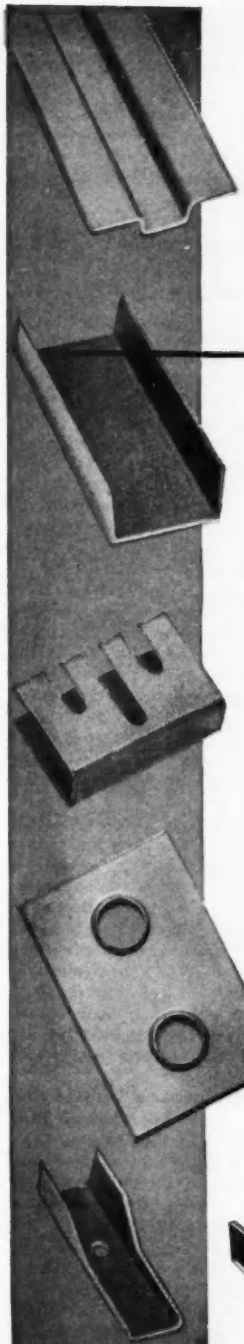
—W—

Warner Electric Brake & Clutch Co., South Beloit, Ill.
Electric brakes & clutches—$61,619 (70)
Electric brakes—$75,000 (40)
Jervis B. Webb Co., Detroit, Mich.
Ordnance parts—$34,617 (65)
Wemac Company, Inglewood, Calif.
Aircraft parts—$27,164 (45)
Western Gear Works, Lynwood, Calif.
Aircraft gears—$2,602 (65)
Westinghouse Electric Corp., Trafford, Pa.
Ductile iron—$669,500 (50)

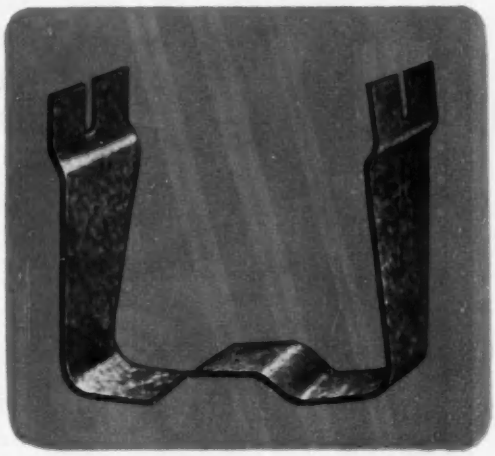
—Y—

Young Radiator Co., Matton, Ill.
Heat exchangers—$25,893 (65)

HARDENED & GROUND PARTS
to exact specification
This spring pivot bolt typifies our machining versatility and strict adherence to specifications. Bolt is made from 1⅞" high-carbon alloy steel hex bar stock; overall length, 5⅝". Threads are precision cut, concentric with body diameter. After heat treating, threads are re-threaded to the specified pitch diameter. Bearing surface is ground to a fine micro-finish, ± .001 tolerance. The very latest equipment is used to make the knurling clean and sharp.
Brown Hardened and Ground Parts have served the automotive industry for over 40 years. Our specialty is precision machining, scientifically-controlled heat treating and micro-finish grinding. How can we serve you? Write or wire . . .
Henry W. Brown
President
Experienced production on:
King Pins
Shackle Bolts
Shackle Pins
Brake Anchor Bolts
Countershafts
Idler Shafts
Stub Axle Shafts
Steering Ball Bolts
Beam Balls and Bolts
5th Wheel Rocker Shafts
Wheel Studs
Water Pump Shafts
. . . anything in the hardened and ground line, of any analysis steel, up to 4".
THE BROWN CORP.
213 BELLEVUE AVE. SYRACUSE, N. Y.
C. H. Elliott, 3407 Clarendon Rd., Cleveland • N. F. Spring, 4716 Balfour Rd., Detroit • R. G. Sanderson, 6600 N. Clark St., Chicago • Harry J. Windmiller, 1704 Carlton, Fort Worth • Johns Wilson & Co., 1440 N. Spring St., Los Angeles, Calif. • John B. Hunt, 5811 S.E. Yamhill St., Portland, Ore.



For Formed Shapes...



from dependable laminated plastics...

IT'S C-D-F POST-FORMING DILECTO

You can combine the good electrical and mechanical properties of C-D-F Dilecto laminated plastic with the low cost operation of post-forming. The result: Better products for many uses at lower cost. Usually no complicated dies are needed to post-form C-D-F Dilecto and the required heating may be done with the simplest equipment.

Your C-D-F sales engineer can help you select the proper Dilecto grade for your post-forming requirements. If you would rather have C-D-F post-form your parts, he'll be happy to quote you on any quantity. Call him today (Sales offices in principal cities)—*he's a good man to know!*

Moisture resistant, light weight, mechanically strong Dilecto is formed from sheets of impregnated cloth or paper. Think... Dilecto may be the tough, versatile plastic for the product now on your drawing board!

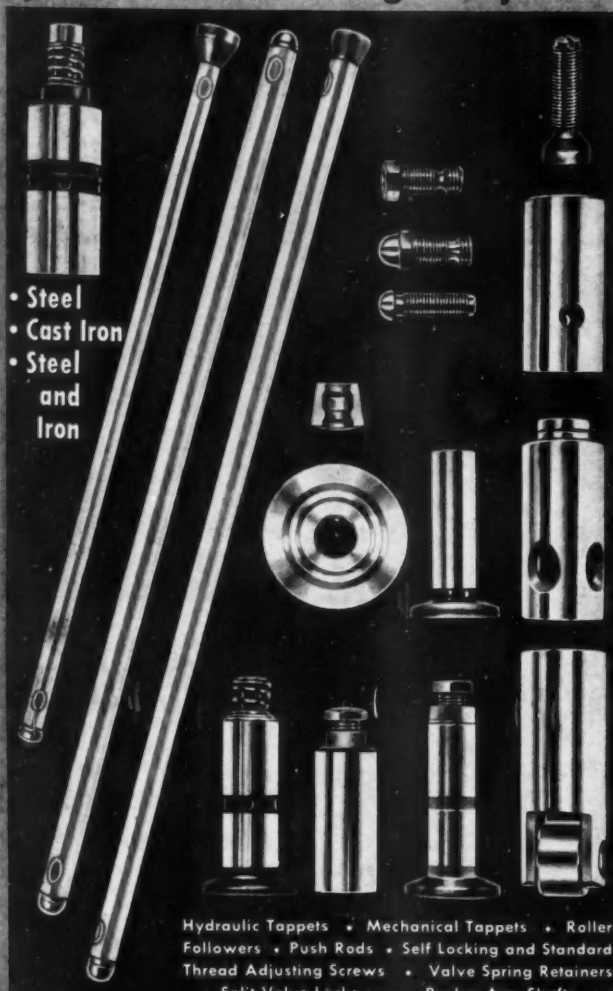
CDF

Continental-Diamond Fibre Company

GENERAL OFFICES:

NEWARK 2, DELAWARE

"CHICAGO"
precision valve gear parts



Hydraulic Tappets • Mechanical Tappets • Roller Followers • Push Rods • Self Locking and Standard Thread Adjusting Screws • Valve Spring Retainers Split Valve Locks • Rocker Arm Shafts •

Connecting Rod Bolts.....Hydraulic Cylinder Pistons
Cylinder Head Studs.....Cylinder Head Cap Screws
Main Bearing Studs.....Main Bearing Cap Screws
Flywheel to Crankshaft Screws.....Diesel Energy Cells
Wheel Bolts and Studs.....Differential Carrier Screws
Oil Pump to Distributor Shafts.....Remote Control Levers
Automatic Transmission Valves.....Water Pump Shafts

Special Screw Machine Parts 1/16" to 8" Diameter • Cap Screws • Set Screws • Nuts • Studs • Taper Pins • Socket Screw Products.

The CHICAGO SCREW COMPANY
2801 WASHINGTON BLVD.
BELLWOOD, ILL.
Established 1872

BUSINESS PULSE

(*Continued from page* 70)

preted as an indication that the mine-union president will attempt to win increases for his workers at least equal to those which the steel workers received.

New Employment Record

Aside from the effects of the steel strike, most indicators of business activity continue at a high level. Employment in June established a new record for the month, rising some 1½ million above that for May and ¾ of a million above that for June of last year. The increase from May to June was due largely to a seasonal rise in farm employment. At the same time, the seasonal entry of students and graduates into labor force resulted in a rise of about 200,000 in the unemployment total.

Retail-trade activity has been holding slightly above last year's level in recent weeks, despite very high temperatures in some of the nation's most important centers. The Department of Commerce reports that retail sales in June exceeded those of a year ago by about one per cent in dollar value. There were rathr wide fluctuations in sales of durable goods, but apparel-store sales showed gains between two and three per cent.

Expenditure for new construction in June was substantially higher than that in the corresponding period last year, as a sharp rise in outlay for public projects much more than offset a slight decline in the private sector. Bank debits to deposit accounts outside New York City were greater than in May of a year ago. Electric power production, although it has continued to vary seasonally, has been running consistently above last year's comparable figures.

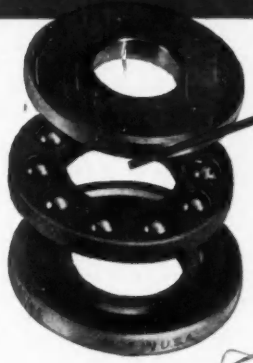
Prices have shown mixed tendencies in recent weeks. The wholesale price index compiled by the Guaranty Trust Co., which reflects price movements in basic commodities, continued to decline from mid-June to mid-July, thus extending the trend which has been dominant since February, 1951. By mid-July, the index had reached the lowest level since August, 1950, just after the outbreak of the Korean conflict. On the other hand, the cost of living rose to an all-time high on June 15, standing at 189.6 per cent of the 1935-39 average. This was 0.3 per cent above the mid-May level, 2.4 per cent higher than in June of last year,

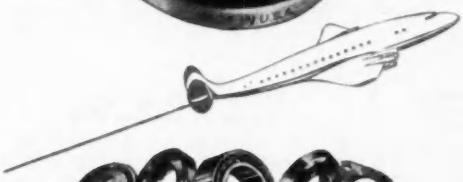
(*Turn to page* 110, *please*)

another successful combination

VICKERS PUMPS and Aetna BEARINGS

Vickers pumps such as this find wide application in the hydraulic systems of both military and commercial passenger aircraft. Together with Vickers hydraulic motors they automatically maintain proper cabin pressure regardless of varying volume demand and engine speed. They have numerous other applications in hydraulic servo systems.





Standard and Special Ball Thrust Bearings • Angular Contact Ball Bearings • Special Roller Bearings • Ball Retainers • Hardened and Ground Washers • Sleeves • Bushings

PUMPS made by Vickers, Incorporated, of Detroit, Michigan, are serving with utmost reliability today in one of the most grueling applications found anywhere in modern aircraft—the hydraulic system.

This enviable record for dependability started when Vickers, to solve a nagging anti-friction problem, switched to Aetna bearings. With every other aspect of the Vickers pump perfected and thoroughly service proven, the addition of Aetna bearings completed the picture. Today, Vickers hydraulic pumps are earning new laurels for performance with an ever-widening number of aircraft makers. For example, one major airline using Vickers-equipped planes, flew 304,578 supercharger pump hours during 1951 *without a single bearing failure.*

Solving difficult bearing problems to help make good products better has been one of Aetna's most intensified engineering activities for 36 years. Why not call on Aetna the next time YOU have a problem involving bearings or precision parts?

AETNA BALL AND ROLLER BEARING COMPANY

4600 Schubert Avenue • Chicago 39, Illinois

In Detroit — Sam T. Keller — 2457 Woodward Avenue

BUSINESS PULSE

(*Continued from page* 108)

and 11.4 per cent above the figure just before the outbreak of the Korean war.

Liberalized Price Controls

Since the new stabilization law became operative on July 1, developments in price control have been in the direction of liberalization. About 90 per cent of all products in the fruit and vegetable field have been freed from controls, an action necessitated by that provision of the law exempting fresh and processed fruits and vegetables from price curbs. Another factor that has sped the liberalization process is the sharp reduction voted by Congress in the funds for enforcement. It is expected that half of the 12,000 employes of the Office of Price Stabilization will be discharged by September 1, leaving a force insufficient to police a complex system of controls. Consequently, the OPS intends to suspend existing ceilings on retail prices of a wide range of consumer goods.

In a last-minute scramble to finish essential business before adjourning for the Chicago political conventions, Congress completed work on all pending money bills in the early days of July.

By the time they had finished, the legislators had voted more than $80 billion in new funds for fiscal 1953, some $8.4 billion less than the Administration wanted. The largest cuts were made in the Defense Department request, from $51.4 billion to $46.6 billion, and in the Mutual Security Program, from $7.9 billion to $6.0 billion.

Large Deficit Foreseen

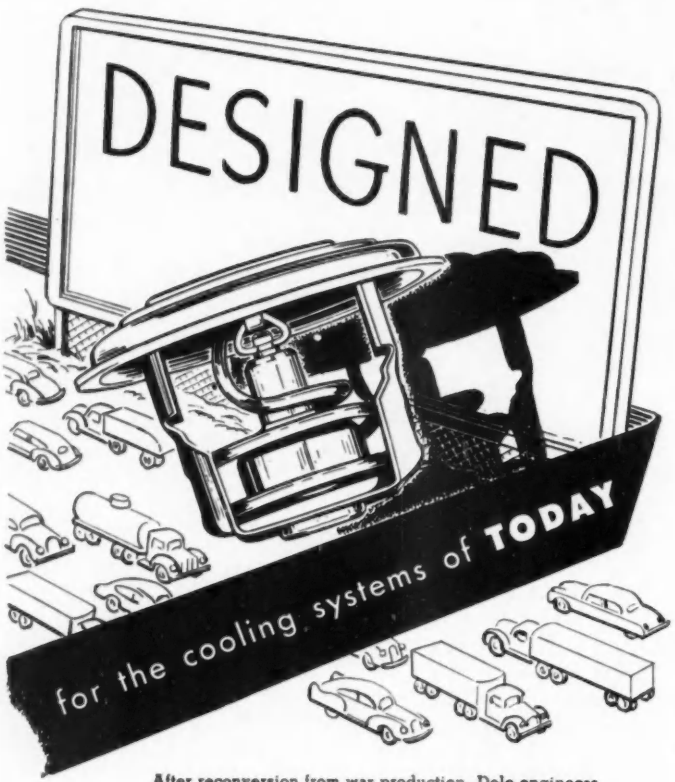
The latest authoritative estimate forecasts a revenue total for the coming year of only $68.3 billion. If this proves to be accurate and if the Government succeeds in spending the full $80 billion appropriated, a deficit approximating $12 billion will result. This contrasts with a deficit for fiscal 1952, which ended June 30, of slightly more than $4 billion.

A deficit of the magnitude of $12 billion is fraught with inflationary dangers. Whether these dangers quickly materialize or not depends to a large extent on how the Treasury finances the deficit amount. Since the first major deficit financing of this year—the issue of 2¾ per cent 1958 bonds dated July 1—the Federal Reserve System has played virtually a neutral role in the money market, with the result that some commercial banks have been hard pressed for reserve funds. If the Treasury holds to such a policy—and the general belief seems to be that it will—the Treasury may be forced to revise upward the yields on its securities in order to attract nonbank money. If this is done, the impact of the deficit financing on the price structure will be minimized.

Kropp Forge Completes Large Expansion Plan

Completion of a $4.5 million improvement and expansion program at Kropp Forge Co., providing new facilities for all phases of forging operation, particularly the production of aircraft parts, was recently announced.

New equipment installed and now in operation includes a 40,000-lb drop forge hammer, a 4000-ton forging press, additional furnaces for heating material to forging temperature, new die sinking facilities, handling equipment, and heat treating units.

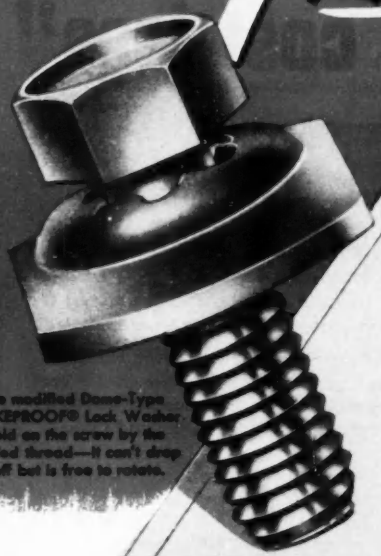


After reconversion from war production, Dole engineers designed a completely new Dole Thermostat—announced in 1949—widely used today. This is the first thermostat developed especially to work with the smaller radiators, higher pump pressures and pressure caps used in today's sealed cooling systems . . . Such development work is typical of Dole's cooperation with the industry's design engineers. This is how Dole has long served manufacturers in helping them achieve top performance for their products.

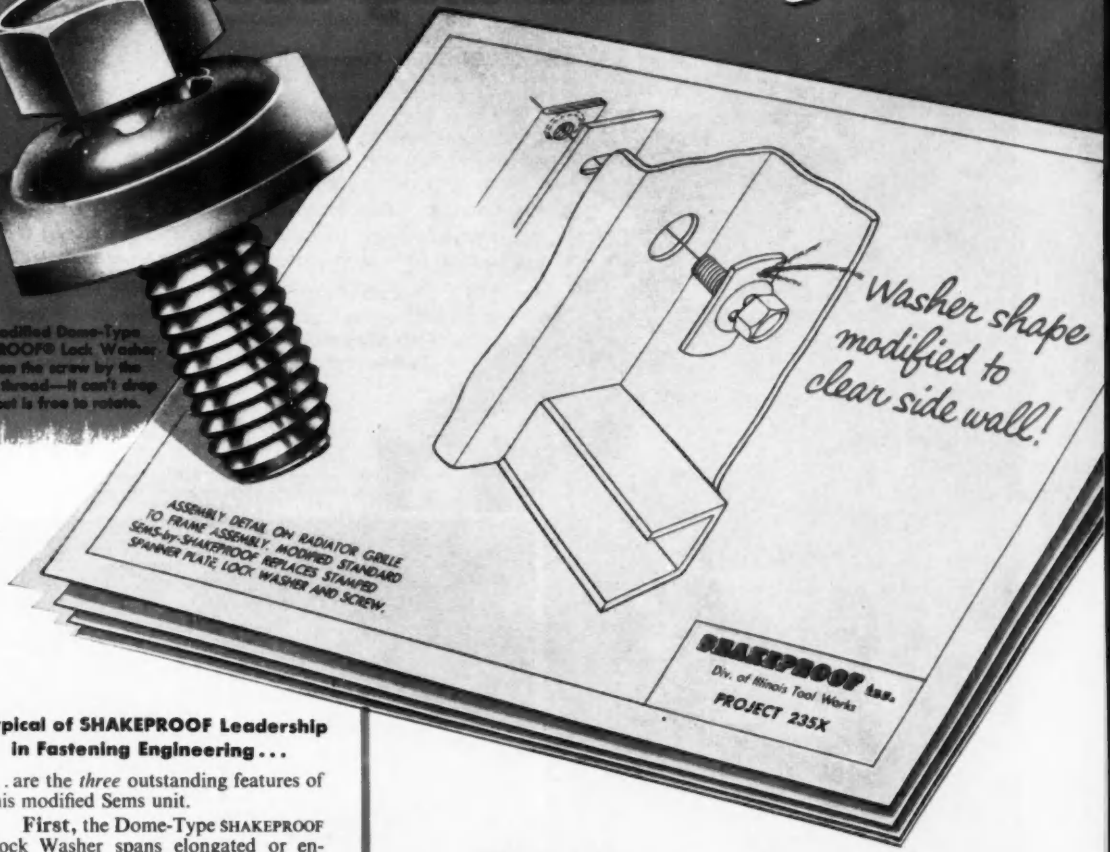
DOLE CONTROL WITH DOLE
DV Thermostats

THE DOLE VALVE COMPANY
1901-1941 Carroll Ave., Chicago 12, Illinois
Detroit • Los Angeles • Philadelphia

1 Part Instead of 3



The modified Dome-Type SHAKEPROOF® Lock Washer is held on the screw by the rolled thread—it can't drop off but is free to rotate.


Washer shape modified to clear side wall!
ASSEMBLY DETAIL ON RADIATOR GRILLE TO FRAME ASSEMBLY. MODIFIED STANDARD SEMS-by-SHAKEPROOF REPLACES STAMPED SPANNER PLATE, LOCK WASHER AND SCREW.
SHAKEPROOF Inc.
Div. of Illinois Tool Works
PROJECT 235X

Typical of SHAKEPROOF Leadership in Fastening Engineering . . .

. . . are the *three* outstanding features of this modified Sems unit.

First, the Dome-Type SHAKEPROOF Lock Washer spans elongated or enlarged clearance holes providing great resilience and locking power.

Second, Shakeproof pre-assembly combines washer and screw as a single easy-to-handle unit.

Third, special modification of the washer shape permits application in restricted space.

Shakeproof fastening engineering like this can give *you* better fastenings and reduce your costs too!

SHAKEPROOF inc., Division of Illinois Tool Works, Elgin, Illinois. In Canada: Canada Illinois Tools Limited, Toronto, Ontario.

for Better Fastenings and Lower Assembly Costs!

SHAKEPROOF inc.

"Fastening Headquarters"

T.M. REG. U.S. PAT. OFF.

"These American Springs are better —and they cost less"

says Overhead Door Corporation

You don't have to be a Hercules to open these doors, because all the muscle-power is furnished by American Quality Springs. The door and springs are so delicately balanced that the massive 16-foot, 340-lb. garage door can be operated easily.

The American Springs for this application must withstand very large deflections (from 27″ to 48″). They must exert a constant force as the door is raised and lowered; and they need a healthy amount of reserve strength for long life.

Failure is no problem with these American Quality Springs. As a matter of fact, Overhead Door

ANYBODY can open this 16-foot, 340-pound door. The American Quality Springs exert a constant pull, and allow effortless action.

AT TOP OF PHOTO, notice how far these American Quality Springs must deflect in the "OVERHEAD DOOR."

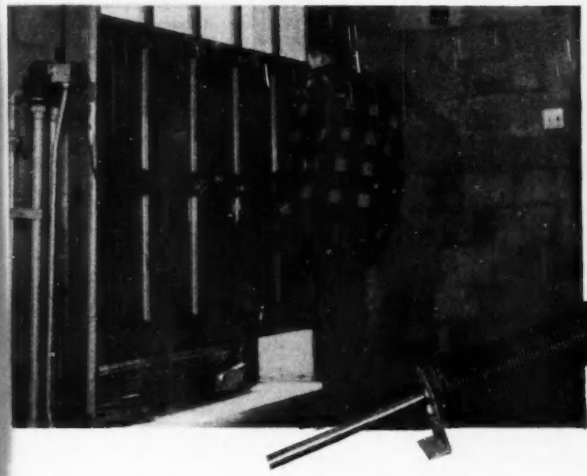
than counterweights

Corporation says, "We have been building doors for 32 years and practically all of those original doors still have their original springs."

The Overhead Door Corporation prefers a spring system (instead of counterweights) for two big reasons—and the most important one is cost. They get 500 pounds of pull from a spring at 25% less cost than if they used iron weights. Also, anyone who opens a spring-loaded door does not have to overcome the inertia of door plus weights. The door is practically weightless the instant you move it.

American Steel & Wire can produce and help you design a spring for just about any application, any size, any steel or finish. Let our skilled spring engineers show you how low in cost a truly superior spring can be. Call our nearest District Sales Office or write to American Steel & Wire Division, Rockefeller Building, Cleveland 13, Ohio.

"OVERHEAD DOORS" are widely used for industrial applications. Many of these industrial doors have been opened 100-150 times daily for *20 years* without a spring failure.



OVERHEAD DOOR CORPORATION also makes many doors utilizing torsion springs. This spring is actually twisted around a shaft when it "winds up." Despite the high stresses, these American Quality Springs give trouble-free service.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

U·S·S American Quality Springs

UNITED STATES STEEL

CALENDAR

OF COMING SHOWS AND MEETINGS

Third Annual Elkhart Lake Road Races and Rally, Sports Car Club of America, Elkhart Lake, Wis. ..... Sept. 5-7

Copenhagen Truck Show, Copenhagen, Denmark ..... Sept. 5-14

American Standards Assn., Third National Standardization Conference, Chicago, Ill. ..... Sept. 8-10

Institute of Traffic Engineers (23rd annual meeting, Sherman Hotel), Chicago, Ill. ..... Sept. 8-11

American Society of Lubrication Engineers, First National Symposium, Chicago, Ill. ..... Sept. 8-9

Instrument Society of America (seventh annual meeting), Cleveland, Ohio ..... Sept. 8-12

SAE Tractor Meeting, Milwaukee, Wis. ..... Sept. 9-11

16th Commercial Show, Earls Court, London, England ..... Sept. 26-Oct. 4

SAE National Aeronautic Meeting, Los Angeles, Calif. ..... Oct. 1-4

Paris Automobile Show, Paris, France ..... Oct. 2-12

Society of Industrial Packaging and Materials Handling Engineers, 7th Annual Exposition, Chicago, Ill. ..... Oct. 13-16

37th International Motor Exposition, London, England ..... Oct. 22-Nov. 1

National Metal Show, Convention Hall, Phila., Pa. ..... Oct. 20-24

SAE Transportation Meeting, Pittsburgh, Pa. ..... Oct. 22-24

American Gear Manufacturers Association, semi-annual meeting, Edgewater Beach Hotel, Chicago, Ill. ..... Oct. 26-29

Transport Aircraft Hydraulic Conference, Park-Sheraton Hotel, Detroit, Mich. ..... Oct. 28-29

SAE National Diesel Engine Meeting, St. Louis, Mo. ..... Oct. 30-31

Montreal Tool and Equipment Show, Show Mart Building, Montreal, Canada ..... Nov. 11-14

16th Annaul Time and Motion Study and Management Clinic, Industrial Management Society, Sheraton Hotel, Chicago, Ill. Nov. 5-7

SAE National Fuels and Lubricants Meeting, Mayo Hotel, Tulsa, Okla. ..... Nov. 6-7

Third Annual International Motorama, Los Angeles, Calif. .. Nov. 7-16

API 32nd Annual Meeting, Conrad Hilton Hotel, Chicago, Ill. .. Nov. 10-13

American Institute of Electrical Engineers Conference on Recording and Controlling Instruments, Benj. Franklin Hotel, Phila., Pa. ..... Nov. 17-18

7th Midwest Conference, American Society for Quality Control, Claypool Hotel, Indianapolis, Ind. ..... Nov. 20-21

Society for Experimental Stress Analysis, Annual Meeting and Exhibition, Hotel McAlpin, New York, N. Y. ..... Dec. 3-5

1953

SAE Annual Meeting, Sheraton-Cadillac Hotel, Detroit, Mich. Jan. 12-16

Plant Maintenance Show, Public Auditorium, Cleveland, Ohio. Jan. 19-22

National Transport Vehicle Show and Fleet Maintenance Exposition, New York, N. Y. ..... Feb. 24-27

American Society for Testing Materials, Spring Meeting, Detroit, Mich. ..... Mar. 2-6

National Association of Corrosion Engineers Ninth Annual Conference and Exhibition, Hotel Sherman, Chicago, Ill. ... Mar. 16-20

German Vehicle Show, Frankfort, Germany ..... Mar. 19-29

Fifth Materials Handling Exposition, Convention Hall, Philadelphia, Pa. ..... May 18-22

American Society for Testing Materials, Chalfonte-Haddon Hall, Atlantic City, N. J. .... June 29-July 3

Eighth National Instrument Conference and Exhibit, Chicago, Ill. ..... Sept. 21-25

Ostrander-Seymour Pre-heat Gap Press used in molding All-Plastic Printing Plates. Arrows indicate position of 14", Model "C" NOPAK Cylinder and 2 NOPAK 4-Way Valves. (The 3" NOPAK Cylinder is not visible).

18 Ton Platen Pressure

Produced by NOPAK Cylinder

This Pre-heat Gap Press is designed and constructed expressly for the efficient molding of All-Plastic Printing Plates . . . by the Ostrander-Seymour Company of Chicago. 18 Ton Platen Pressure is generated by a 14" NOPAK Model "C" Air Cylinder, working at 100 P.S.I. line pressure, through toggle leverage. The upper platen, equipped with heating coils, is pulled down onto the work. A NOPAK 3", Model "E" Cylinder operates the sliding, loading apron which positions the work under the platen. Each cylinder is controlled by a NOPAK ⅜", 4-Way Hand-Operated Valve.

This is a typical example of how NOPAK Valves and Cylinders are used for the efficient application and control of air or hydraulic power. Others are shown in the NOPAK Application Manual. If you haven't seen it, write, or ask your NOPAK representative.

GALLAND-HENNING MFG. CO, 2774 S. 31st St., Milwaukee 46, Wis.

•

Refer to Sweet's File for Product Designers, or write for Bulletin SW-1.

•

Representatives in Principal Cities.

NOPAK

VALVES AND CYLINDERS

DESIGNED for AIR and HYDRAULIC SERVICE

A 7212-½-IA

first with the finest for 45 years

"ACOUSTACOIL"

complete seating assembly . . .

Car manufacturers' experienced trim engineers know they can't beat coil springs for greatest riding comfort. Now, with "Acoustacoil" they can't beat coils for low cost! Here, for the first time, the coil spring seat and back constructions are combined with frames in one complete assembly, ready for car manufacturers to upholster and install on the assembly line at least possible cost.

You, too, can save two ways: . . . (1) You pay less for these complete L. A. Young manufactured assemblies than the total cost of frames and spring units from separate sources . . . (2) Due to advanced design features, you can also upholster and install them at less cost.

If you want superior comfort at actually less total cost, then specify L. A. Young "Acoustacoil" without delay!

the ULTIMATE in LUXURY *at Lower Cost*

- **Being installed as original equipment in cars of leading make.**
- **Hailed by car manufacturers as the last word in luxury at minimum cost.**
- **Amazingly simplified design that saves greatly on critical materials.**
- **Combines strong tubular frames with dependable coils, all in one assembly.**
- **Introduces new type of foundation support for the coils, and new assembly method.**
- **Provides far more toe room under backs for rear seat passengers.**
- **Easier to upholster and install in cars in production. Lighter weight, yet stronger.**
- **New over-all flock finish soundproofs, stabilizes, and prevents rust.**

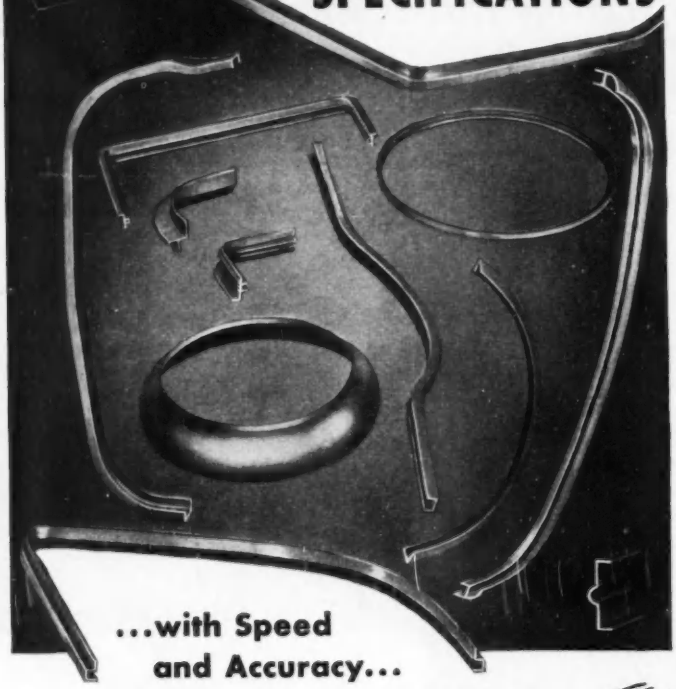
L. A. YOUNG SPRING & WIRE CORPORATION

GENERAL OFFICES: 9200 Russell, Detroit 11, Michigan

IN CANADA: L. A. YOUNG INDUSTRIES, LTD., Windsor, Ontario

13 PLANTS: 3 in Detroit, Mich. • Chicago and Joliet, Ill. • Trenton, N. J. • Memphis, Tenn. Leeds, Ala. • Los Angeles and San Leandro, Calif. • Windsor, Toronto and Montreal, Canada

STRETCH and COMPRESSION
CONTOUR FORMED PARTS
to your
SPECIFICATIONS



...with Speed
and Accuracy...
no buckling of horizontal flanges

Economy is one of the many advantages that make Contour Forming an important factor in the construction of aircraft, jet engines, guided missiles, railroad coaches, trucks, buses, etc. Single or compound curves, true, full circles or segments, shallow bends or short radius curves can be formed in most metals, including 95% titanium. Many manufacturers have profited by using our highly experienced Forming Division as an extension of their own production facilities. Send us a print and quantity requirements of some of your needed parts and we will quote on them.

Our new 32-page catalog CF-352 is just off the press and your copy is waiting for you. Send for it.

THE CYRIL BATH COMPANY
Manufacturers of Metal Forming Machinery
6915 MACHINERY AVENUE • CLEVELAND 3, OHIO

Band Sawing Rubber

(*Continued from page* 32)

is satisfactory as a coolant and the nature of cut limits cutting rate to 60 sq in. per min which is nevertheless very substantial. Incidentally, this material is cut in strips ¼ in. wide and this dimension is held within 0.020 in. and thus proves the free cutting advantage of this type of blading over the conventional blade for this particular kind of work.

Vanir Rubber—4 in. Thick

Natural or Synthetic

A 3 pitch buttress of one in. width at a velocity of 5000 fpm is advisable for this application, in this case the glycerine compound will be more effective in connection with a specially designed spray lubricator. A cutting rate of 300 sq in. per min is easily obtained and blade life is surprisingly long with the proper medium, this applies to any rubber cutting application for which it is recommended.

Tire Rubber—

Natural or Synthetic

This operation, if performed on a production basis, requires a combination of actual and friction sawing. Recommendations are to primarily take all cuts on the rubber to the depth of bead wires with a one in.-6 pitch blade at 3000 fpm. This blade is then substituted with a one in.-10 pitch special friction blade to cut through the bead wires at 12,000 fpm. Cutting rates are 38 and 10 sq in. per min, respectively; the 1-40 soluble oil spray lubricating technique is also advisable with this application.

Extruded Rubber Moulding—

½ in. Maximum Thick

A ½ in.-14 pitch standard blade at 3000 fpm is most effective on this material. The velocity should be proportionately reduced to suit additional increase in height or heights of cut. This material cuts freely and time per cut as determined in seconds varies according to design. No coolant is used.

(*Turn to page* 120, *please*)

STROMBERG

CARBURETORS

Lasting

Performance in Today's Cars Will be Tomorrow's Strongest Selling Point!

Today, more than ever, new car buyers are looking for features that assure long, satisfactory performance. Engine components that contribute to this accomplishment now assume even greater importance as they not only influence today's sales, but become tomorrow's strongest selling point.

For owner loyalty as well as immediate sales, it pays to specify Stromberg* — the carburetor built for *lasting performance.*

*REG. U. S. PAT. OFF.

ECLIPSE MACHINE DIVISION OF Bendix AVIATION CORPORATION

• Standard Equipment Sales: Elmira, N. Y.
• Service Sales: South Bend, Ind.

Export Sales: Bendix International Division, 72 Fifth Avenue, New York 11, N. Y.

WHAT *Life-Lines* REALLY DELIVER IS MORE SERVICE...LESS SERVICING

"Whips Trouble Spots" Say users of these *Life-Lines*

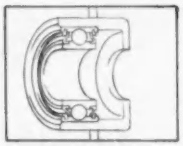
"Neither Vibration Nor Moisture Are Problems Now," says the Richard Ore Co. "We installed 7 Westinghouse Life-Linestarters® in a particularly difficult application, a mine concentrating mill. We were off to a flying start immediately—the Westinghouse Life-Linestarter is easier to install because of straight-through wiring and the arrangement of breaker and starter in a single enclosure. Outages due to moisture and vibration have been virtually eliminated. That had been our biggest headache . . . more Life-Lines will be installed shortly."

"No Motor Failures of Any Kind, Now," says Watchcase Manufacturer. "Our punch-press motors were 14 feet off the floor . . . just high enough so that lubrication was often 'forgotten'. Frequent bearing failures and burnouts resulted until we 'perched' pre-lubricated Life-Lines up there two years ago. Since then . . . no failures of any kind. We've standardized on Life-Lines."

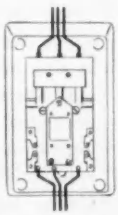
"Straight-Through Wiring Answered My Problem," says the Baker Refrigeration Corp. "We have a new air-conditioning design that requires the use of two starters. We found that the Westinghouse Life-Linestarter could be more easily mounted in a group within our enclosure—saved assembly labor. This completely sold me on your straight-through wiring."

"Increase Bearing Life 8 Times," says Oak Hill Firebrick Co. "We were using sleeve-bearing motors on a shaker screen in a firebrick plant. Bearings never lasted over six months. Life-Lines installed over four years ago have been running 16 hours a day ever since. Pre-lubricated bearings have been perfect."

Typical? Yes. Typical of hundreds of reports in every industry. Why not install these dependable partners on your machines? A check with your Westinghouse representative will bring you full details. Ask for copies of "Life-Line Motor Case History Book", B-4769-A and "Tomorrow's Starter Today", B-4677, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-21697



Needs no lubrication. Pre-lubricated, factory-sealed bearings eliminate troubles due to under or overlubrication, dust and dirt.



Straight-through wiring. Three line terminals at top; three load terminals at bottom—all easily reached from front.

Bonderite-protected starter enclosure. Anchors enamel as if it were part of steel itself. Finish will not blister or corrode.

YOU CAN BE SURE...IF IT'S
Westinghouse
Life-Line
MOTORS and CONTROLS

where fine gears are produced

efficiently • economically!

● At Fairfield, YOUR GEARS are in the hands of specialists equipped with every modern facility for producing fine gears EFFICIENTLY, ECONOMICALLY. By specializing exclusively in "Fine Gears Made to Order" for more than thirty years, Fairfield has become one of America's largest producers of these parts. This is why many makers of construction machinery... agricultural implements... machine tools... military equipment... tractors, trucks, and buses now regularly depend on Fairfield to meet their requirements. *For the Best in Gears, Specify Fairfield.*

Right—Entrance to offices of Fairfield's new plant in Lafayette, Indiana.
Above—Hobbing Spur Gear.

FAIRFIELD MANUFACTURING CO.
2303 So. Concord Road, Lafayette, Indiana

For FINE GEARS

Band Sawing Rubber

(*Continued from page* 116)

Rubber Sheeting—

With Core of Thin Steel Wire

This is another super high speed application requiring a ¾ in.-14 pitch friction blade at 12,000 fpm. The cutting rate is 300 lineal ipm but will drop to 15 ipm if the machine is limited to a maximum velocity of 5000 fpm. No coolant is used.

Buna Rubber—

5 in. Thick

This material responds efficiently to a 3 or 4 pitch buttress at 4000 fpm. Either a ¾ in. or ½ in. wide blade can be used, depending on contour or radius involved. The glycerine mixture is also herewith recommended as a coolant, cutting rate will average 240 sq in. per min on the thickness indicated and this material may be cut to a height of six in. with acceptable accuracy.

Rubber Rollers—

2 in. Diameter and ½ in. Wall

This application also requires a ¾ in.-10 pitch standard blade but a velocity of 1500 fpm which is the maximum of the conventional sawing speed range. A water coolant is suitable and actual time per cut is 10 seconds.

Rubber Battery Molds—

Light and Dark

Both light and dark materials of this nature cut most efficiently with a ¾ in. standard 10 pitch blade, this is however a low speed operation with a velocity of from 200 to 250 fpm and drip lubrication consisting of a 1:40 solution of high quality soluble oil should be used to extend saw life by counteracting the abrasiveness of this material. Cutting rates vary from 25 to 35 sq in. per min providing the blade is of the precision type and not simply a so-called hardened tooth blade.

(*Turn to page* 122, *please*)

HESS HAULS
bulk cement and depends on
SKF

Here's an unusual trailer—operated by Hess Cartage Company of Melvindale, Michigan.

Mr. Carl Hess designed it to haul bulk cement. Each unit incorporates a screw and air combination conveyor for automatic unloading.

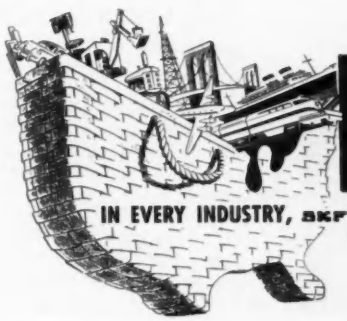
The Hess fleet operation is a big one—255 tractors, and 525 trailers. It covers 10 million miles a year in five states, has average payloads of 45,000 to 60,000 pounds, mostly cement and structural bar, sheet and structural steel.

In their 35 years of service to its customers, Hess Cartage has learned—as so many fleet operators have learned—that careful maintenance pays off. Part of this maintenance is in the form of SKF Bearings—always sure to deliver rugged endurance and dependability.

Operators of heavy on- and off-the-road automotive equipment know SKF Bearings well. They depend on SKF Single Row Deep Groove Bearings for their ability to carry combination radial and thrust loads at high speed, for their shields and seals which retain lubricant and exclude dirt. They depend on SKF Cylindrical Roller Bearings for extremely high radial capacity and low friction. And for propeller shaft boxes on heavy-duty equipment, maintenance men specify SKF Self-Aligning Ball Bearings.

Everyone, from equipment designer to equipment operator, depends on SKF engineering for advanced equipment and dependable performance.

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.—*manufacturers of* **SKF** *and* HESS-BRIGHT *bearings.* 7368

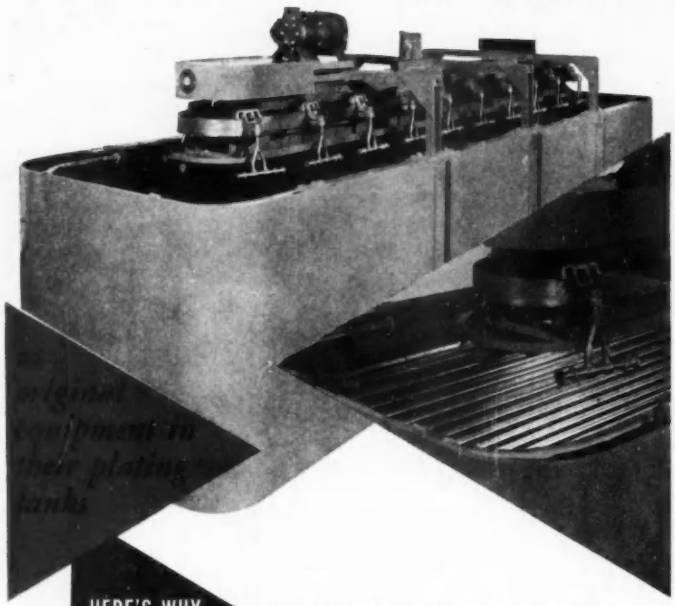


SKF®
BALL AND ROLLER BEARINGS

IN EVERY INDUSTRY, SKF Puts The Right Bearing In The Right Place

of course...

CROWN RHEOSTAT USES PLATECOILS
(REPLACE PIPE COILS)



HERE'S WHY

Original equipment manufacturers looking for ways to add sales advantages to their machines without adding to their cost have been quick to standardize on **Platecoils**. The **Crown Rheostat and Supply Co.**, Chicago, Illinois, has joined the rapidly growing list of **Platecoil** users with the following results: "The quality workmanship of **Crown** equipment calls for the installation of only the ***best accessories*** and **Platecoil** easily enters into this group of items ***acceptable to a discriminating plating trade.***

"**Platecoils** are advantageous because of their space-saving qualities and high efficiency plus the fact they are so easily cleaned and maintained. **Crown Rheostat and Supply Co.** finds it advantageous to use **Platecoils** in **partially automatic** and **fully automatic** plating machines, barrel plating and still tank equipment."

You, too, will find that **Platecoils** provide better heat transfer for only a fraction of the cost of pipe coils. Engineering and estimating take less time. Installation is simplified and less costly.

Get the complete story on Platecoil savings. Send today for your copy of the new bulletin P71 telling how "Platecoils" overcome the limitations and high cost of pipe coils for ORIGINAL EQUIPMENT MANUFACTURERS. There is no obligation.

Band Sawing Rubber

(*Continued from page* 120)

Sponge Rubber—

Regular and Latex Foam

These particular types of rubber bring up the matter of the other modern bandsaw blade development, namely, the scalloped-edge. This blade is a marked improvement over the conventional straight knife-edge because of increased cutting efficiency afforded by the scallops which measure 7/16 in. from tip to tip. With the straight edge blade, sponge rubber could only be cut by using a shroud even on the thinner sections. The new blade makes it possible, however, to slice through reasonably thick sections without shrouding although with a lesser cutting rate that proportionately diminished as thickness of cut increases.

Sponge rubber, particularly the latex foam type, has a tendency to bind on the machine table and this condition more or less interferes with efficient feeding. An acrylic resin frictionless table sprinkled with talcum powder, or feeding table, will overcome this difficulty. The 7/16 in. scalloped-edge blade at 5000 fpm cuts four in. regular sponge rubber at the rate of 700 sq in. per min and the finish is excellent. No lubricant is used and a light work feeding pressure is most effective. Above recommendations also apply 100 per cent to the cutting of the new latex foam type, which even cuts with greater ease and even less variation in rate as based on increase in material thickness. However, the method of feeding latex foam rubber to the blade differs somewhat from customary procedure; it seems to cut better if pulled rather than pushed through the blade.

Materials Development Seen Aided by GE Stress Formula

Development of high-temperature materials may be greatly speeded up with a stress formula discovered recently at General Electric Co.'s Thomson Laboratory, Lynn, Mass.

GE engineers claim that the formula, which relates strength with time and temperature, may be particularly helpful in the development of improved metals for turbosuperchargers, jet engines, oil refining piping, guided missiles, and atomic power plants.

Power for Power-Steering

EATON ROTOR PUMPS

with Flow-Control

As a pioneer in the development of pumps with flow-control for hydraulic power-steering, the Eaton Pump Division offers unequalled facilities in both design and production in this highly specialized field. The Eaton high-speed power unit provides the desirable advantage of small, compact design. If you are considering this important addition to the ease, convenience, and safety of modern motoring, there are distinct benefits in permitting our engineers to work with yours in the early design stages.

EATON MANUFACTURING COMPANY

CLEVELAND, OHIO

Pump Division

9771 French Road • Detroit 13, Michigan

More Defense Contract Awards

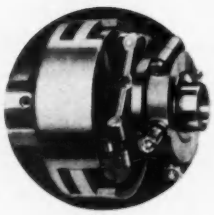
THIS latest list of defense prime contracts that have been awarded covers the period from June 27 to July 18. Items included in this list are for various types of automotive military equipment, including tanks, motorized gun carriages, trucks, warplanes, automotive components and spare parts, automotive maintenance equipment, etc.

Unit quantities and dollar amounts are given for contracts from $25,000 to $250,000. Contracts above $250,000 are indicated by "over $250,000," but their actual dollar amounts and unit quantities are not available.

—A—

Active Gear Co., Inc., Chicago, Ill.
Motor vehicle parts—6500 ea—$41,813

This Sand-and-Cinder Spreader



Makes Highways Better Ways

Highway Equipment Company, of Cedar Rapids, Iowa, has developed a complete line of spreaders that contribute toward better-built highways. ROCKFORD CLUTCHES help regulate the spreading mechanism in the NEW LEADER Sand-Cinder & Chip spreader shown above. Let ROCKFORD clutch engineers help design better power transmission controls for *your* engine-driven equipment.

ROCKFORD CLUTCH DIVISION BORG-WARNER
315 Catherine Street, Rockford, Illinois, U.S.A.

B-W ENGINEERING MAKES IT WORK

B-W PRODUCTION MAKES IT AVAILABLE

ENGINEERING BULLETIN SENT ON REQUEST

ROCKFORD CLUTCHES

J. D. Adams Mfg. Co., Indianapolis, Ind.
Repair parts—10 line itm—$48,820
Allis-Chalmers Mfg. Co., Minwaukee, Wisc.
Pump repair parts—619—$33,376
American Car & Fdy. Co., New York, N. Y.
Gun, spare parts—168 ea—$25,572,325
American Machine & Metals, Inc., East Moline, Ill.
Spare parts—$25,163
American Steel Foundries, Elmes Engineering Division, Cincinnati, Ohio
Hydraulic press—1—$31,239
American Steel Foundries, King Machine Tool Div., Cincinnati, Ohio
Boring machines—2—$85,836
The American Well Wks., Aurora, Ill.
Repair parts—31 line itm—$34,905
Acushnet Process Co., New Bedford, Mass.
Gaskets—$59,806
Adel Div., General Metals Corp., Burbank, Calif.
Spare parts—$37,415
Aeroproducts Div., General Motors Corp., Dayton, Ohio
Actuator kits—1000 ea—$60,892
Aeroquip Corp., Jackson, Mich.
Collar—$48,910
Aircraft Products Co., Bridgeport, Pa.
Pump assy—102 ea—$33,155
Airesearch Mfg. Co., Los Angeles, Calif.
Engine starter—10 ea—$77,822
Pneumatic starter—2 ea
Aluminum Co. of America, Washington 6, D. C.
Aluminum alloy—140,151 lbs—$55,184
American Brake Shoe Co., Kellogg Div., Rochester, N. Y.
Compressors—666 ea—$187,519
American Locomotive Co., Schenectady, N. Y.
Spare parts—½—$2,230,537
Arrowhead Brass Products, Los Angeles 32, Calif.
Primer—$111,870
Automatic Transportation Co., Div. of the Yale & Towne Mfg. Co., Chicago, Ill.
Trucks—517—$2,111,803
Trucks—7—$54,277
Trucks—449—$655,078
Available Truck Co., Chicago, Ill.
Spare parts—various—$39,911

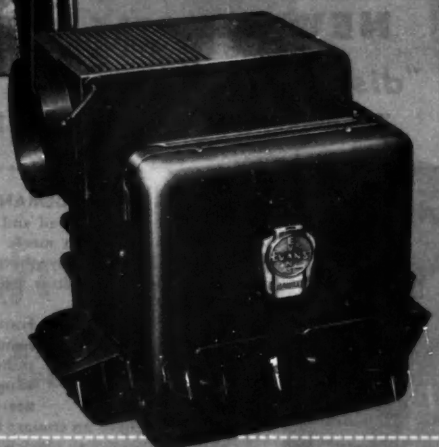
—B—

The Baker Raulang Co., Cleveland, Ohio
Trucks—300—$1,030,352
Trucks—12—$127,356
Baldwin-Lima-Hamilton Corp., Hamilton, Ohio
Lathe—1—$72,172
Baldwin-Lima-Hamilton Corp., Lima, Ohio
Repair parts—32—$163,250
Beech Aircraft Corp., Wichita, Kans.
Alum fuel tanks—$265,440
Spare parts—$750,000

(*Turn to page* 126, *please*)

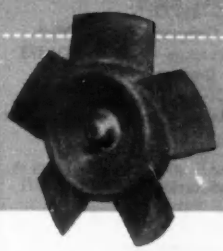
NEED MORE THAN JUST A HEATER?

THIS EVANS *Fresh Air* UNIT IS CUSTOM ENGINEERED AS A COMPLETE HEATING AND VENTILATING SYSTEM



EVANS FEATURES PROVIDE HEAVY DUTY DEPENDABILITY WITH SERVICE-FREE PERFORMANCE

1. Heavy duty bus type low drain motor
2. Heavy duty large capacity core
3. Complete accessibility for inspection or servicing
4. Controls provide accurate selection of warmest air, temperature and flow
5. Fresh or recirculated air, warm or cool, in any combination
6. Large defroster outlets may be located to suit cab requirements



POWERFUL EVANAIR FAN CHANGES CAB AIR 3 TO 4 TIMES PER MINUTE

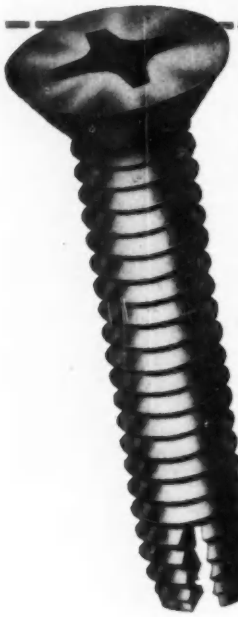
Precision die-molded in lightweight strong metal. Will not chip, crack or bend. Every Evanair fan is exactly the same in characteristics, weight and balance. Aerodynamic design, circulates more air with less noise, less current draw. Material not affected by high or low temperatures. One piece construction, no parts to work loose. Lighter weight results in less load on motor bearings, insuring longer life.

EVANS ENGINEERING IS AVAILABLE TO HELP SOLVE YOUR PROBLEM

The Evans organization is staffed to engineer promptly an installation to your specifications, organized to build prototypes quickly, equipped to conduct precision tests to latest A. S. H. V. E. procedures. Military experience dating back to World War I qualifies Evans to work well with you in meeting the rigid specifications of the Armed Forces. If your needs are for high performance, ruggedly constructed automotive heating and ventilating equipment—custom built to your specifications—it will pay you to consult EVANS PRODUCTS COMPANY, HEATING & VENTILATING DIVISION, DEPT. P-68, PLYMOUTH, MICHIGAN.

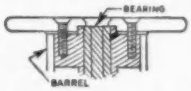
EVANS *ENGINEERS CUSTOM HEATING AND VENTILATING FOR A WORKING WORLD ON WHEELS*

NEW GYROTEX BOBBIN
"discovers" HOLTITE's
TYPE "G" TAP SCREWS



NEW PRODUCTS DEMAND NEW METHODS

Designed, engineered and produced by Formica, the Gyrotex Bobbin meets the strenuous requirements of the new synthetic yarns. It stands up under the tremendous pressures developed by Nylon and Orlon.



Formica Gyrotex Bobbins feature heads which are attached to the flange of the aluminum tube with Holtite-Phillips Type "G" Tap Screws and have no contact with the bearing or the barrel — eliminating closing of the BORE, or other distortions in the bobbin.

CONTINENTAL CONTRIBUTES

The Continental Screw Company contributes to this Formica achievement in the textile field. Its Type "G" Tap Screws are stronger than ordinary fasteners. Consisting of Phillips hardened (heat treated) steel, they are *self-tapping*, with patented slotted points. They automatically eliminate expensive tapping operations.

CONSULT CONTINENTAL — and save

When you have unusual fastening problems that call for fasteners engineered to the application — call in Continental. Get the facts. Write Department A. Continental Screw Company, New Bedford, Mass.

You can count on Continental ©

(*Continued from page* 124)

Bendix Products Div., Bendix Aviation Corp., South Bend, Ind.
Wheel assy—$43,206
Brake & wheel assy—200 ea—$247,748
Bendix Radio Div., Bendix Aviation Corp., Baltimore, Md.
Relays—1000 ea—$42,280
C. L. Berger & Sons, Boston, Mass.
Spare parts—121 itm—$39,588
Blaw-Knox Div., Blaw-Knox Co., Pittsburgh, Pa.
Repair parts—52—$26,970
E. W. Bliss Company, Canton, Ohio
Moulding press—1—$30,285
ress—1—$45,779
E. W. Bliss, Salem, Ohio
Brass shearing—1—$79,140
Bogue Electric Mfg. Co., Paterson, N. J.
Generators—75—$211,100
Bonney Forge & Tool Wks., Allentown, Pa.
Wrenches—156,650—$26,151
Bowen-McLaughlin-York, Inc., York, Pa.
Spare parts—various—$189,942
J. Allen Bradford Co., Auburn, Ala.
Pallets—40,000—$155,600
Briggs & Stratton Corp., Milwaukee, Wisc.
Spare parts—$87,820
Ralph N. Brodie Co., Inc., Oakland, Calif.
Spare parts—$34,911
Brown-Brockmeyer Co., Dayton, Ohio
Grinders—1150 ea—$57,503
Brown & Sharpe Mfg. Co., Providence, R. I.
Screw, milling, grinding machines—71—$464,769
Milling machines—8 ea—$81,688
Brunswick Ordnance Corp., New Brunswick, N. J.
Machine tools—$391,000
Bryant Chucking Grinder Company, Springfield, Vt.
Grinder—6—$84,732
The Buda Company, Detroit, Mich.
Wheel and rings—1282 ea—$34,473
The Budd Company, Harvey, Ill.
Trucks—101—$478,888
The Bullard Company, Bridgeport, Conn.
Lathes—2—$98,864
Drilling, boring machine—1—$49,851
Boring and turning mill—1—$57,871

— C —

Carlton Forge Works, Paramount, Calif.
Rough machined forgings—over $250,000
J. I. Case Company, Racine, Wisc.
Engine—15 ea—$26,928
Engine—30 ea
Caterpillar Tractor Co., Peoria, Ill.
Spare parts—various—$109,948
Cessna Aircraft Co., Wichita, Kans.
Aircraft—5 itms—$175,000
Champion Spark Plug Co., Toledo 1, Ohio
Spark plugs—63,520 ea—$78,765
Chicago Pneumatic Tool Co., Detroit, Mich.
Riveter—$163,535
Chicago Pneumatic Tool Company, Los Angeles, Calif.
Repair parts—1886 line itm—$212,210
(*Turn to page* 130, *please*)

"Made for Each Other!"

SERVICE PISTON RING SETS BY MUSKEGON ARE DESIGNED FOR A SINGLE, SPECIFIC ENGINE!

Like every other part in a new engine, the piston rings are designed especially for that engine. When rings need to be replaced, it is only logical that the *service* rings should be designed especially for that engine too.

Muskegon Piston Ring Company works with the car manufacturer to design and produce service rings in this manner. As a result, engine and rings are truly "made for each other" and will perform with utmost power and economy.

These *Factory Approved* and *Factory Engineered* Service Piston Ring Sets are available only through car dealers and other authorized service outlets.

A set of service rings designed by Muskegon in collaboration with the engine maker.*

MUSKEGON
Piston Rings
MUSKEGON PISTON RING CO.
MUSKEGON, MICHIGAN
PLANTS AT MUSKEGON AND SPARTA
"THE ENGINE BUILDERS' SOURCE"

*Name on request.

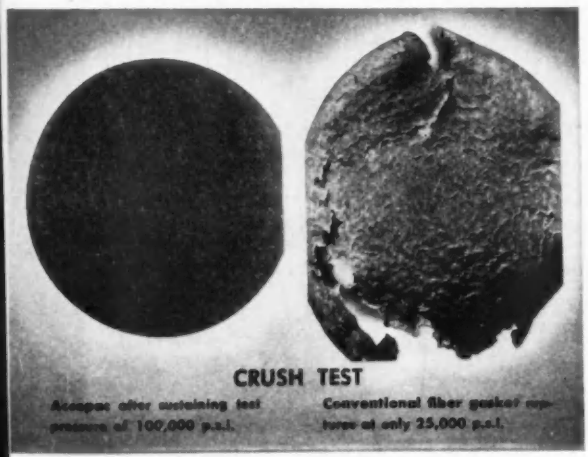
Copyright 1952 by Muskegon Piston Ring Company

New gasket material assures trouble-free service

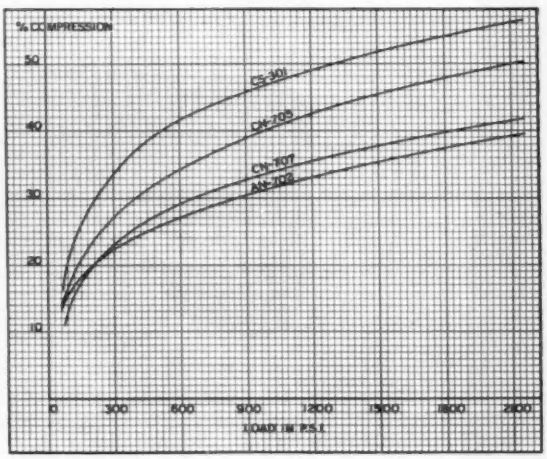
ARMSTRONG'S

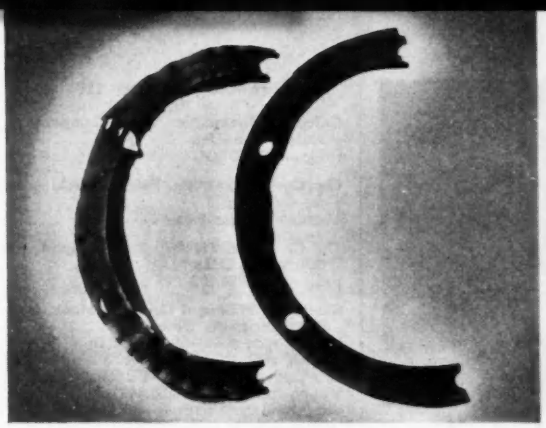
- *Accopac is produced by a patented beater saturation process*
- *Combines cork with fiber and rubber for improved performance*
- *Process uniformly coats cork particles and fibers with rubber*
- *Accopac is dimensionally stable, impervious, and compressible*

HIGH CRUSH RESISTANCE. Loads high enough to rupture a gasket are often present on a flange when high spots absorb full bolting pressure. Thus tightening bolts may actually cause leaks instead of prevent them. Accopac's outstanding crush resistance prevents this.

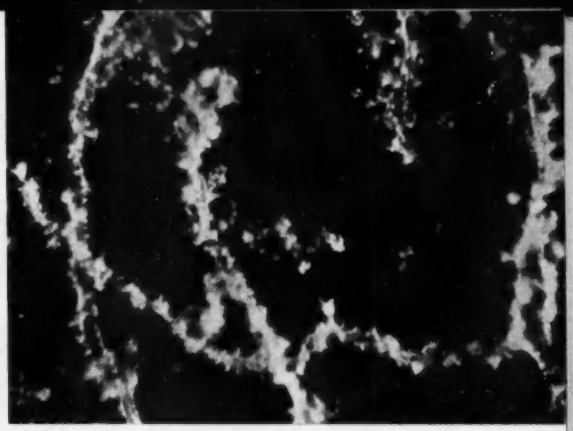


HIGH COMPRESSIBILITY of Accopac is shown by these load-compression curves. With light or stamped metal flanges, this compressibility allows gaskets to conform to irregularities and seal without distorting the flange. On heavy flanges, Accopac gaskets seal without crushing.





NEVER DRIES OUT. Both these fiber sheet gaskets were used for six months in a gear pump circulating hot hydraulic oil. The plant fiber gasket (left) lost its glycerine plasticizer, dried out, shrank, became brittle. The Accopac gasket (right) remained virtually unaffected.



HIGH RUBBER CONTENT. This microphotograph (100X) shows how completely and how uniformly each fiber and each cork particle is enclosed with latex. Accopac is tight, uniform, homogeneous. Strength is very nearly equal either with or across machine direction of the sheet.

ACCOPAC®

ARMSTRONG'S Accopac brings a degree of sealing efficiency to fiber sheet packings that's entirely new. In applications calling for plant fiber gaskets, it offers greatly improved performance and dependability. In fact, Accopac seals so effectively that in many cases it already is being used to replace more expensive gasket stocks.

Cork adds high compressibility

Two things account for most of Accopac's sealing efficiency. The first is the use in it of adequate amounts of cork. The second is a new, patented beater saturation process.

The cork in Accopac adds a high degree of compressibility, as can be seen by the load-compression curves on the facing page. Because of this high compressibility, Accopac works as well on stamped or light flanges as on rough, heavy joints.

In lightweight construction, Accopac conforms to normal irregularities without distorting flanges between the bolts. On rough, heavy flange surfaces, it fills ordinary imperfections to provide a tight, dependable seal.

High crush resistance helps prevent leakers

Accopac is effective in heavy flanges for another important reason. It withstands flange loads up to 100,000 p.s.i. without damage. Conventional fiber materials, on the other hand, often rupture at approximately 25,000 p.s.i. This is demonstrated in a photograph on the preceding page.

Resistance to crushing may be as important on light flanges as on heavy units. Even on relatively light joints, high spots or lack of parallelism can concentrate much of the bolting pressure on small areas of the gasket. The result may be a load sufficient to crush conventional fiber materials. In this you may have a possible explanation of the leaker that grows worse rather than better as flange bolts are drawn tighter.

Dimensional stability insures dependability

The saturants or binders used in Accopac materials are non-volatile and non-extractable. They will not be leached out in service through the action of fluids. Thus an Accopac gasket will not shrink, dry out, and leak in any application for which it is recommended. You can depend on it for a long-lasting seal.

Dimensional stability is further ensured by the uniformity of the latex coating on both the fibers and the cork particles. Consequently, the effect of humidity changes is greatly reduced. Moreover, since the saturants are not fugitive, humidity variations produce no permanent or progressive dimensional change in Accopac. Gaskets kept for long periods will still fit and will still seal effectively. This is especially important in the case of replacement parts that may be stored for months before use.

Fiber and cork locked in rubber

The new beater saturation process used in making Accopac can deposit much larger amounts of rubber on the fibers and cork particles than is possible with any other known method. This rubber coating is uniform and accurately controlled. The resulting sheets are uniformly tight and impervious.

Users report: "No leaks"

In the past 2 years, rigid field tests have been made in a wide range of industrial and automotive applications. Here are some typical comments from users:

"Completely eliminates oil seepage—keeps motor block clean even in dusty farm applications" (Tractor gasket).

"Accopac eliminated leaks which were common with our old plant fiber gasket" (Water pumps).

"Gives a 100% seal" (Cylinder base gaskets).

"Accopac is the only fiber material that gives positive assurance of no leaks" (Gear case gasket).

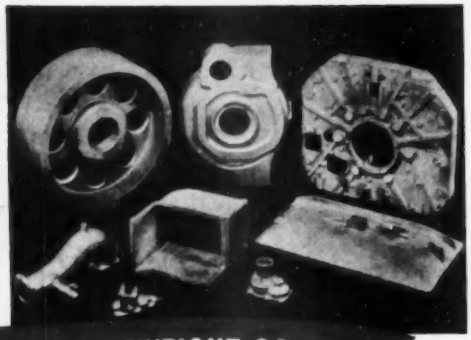
"100% assurance of tight joints and good resistance to corrosion that formerly caused much trouble" (Oil valve).

Many other reports tell of highly effective seals, with no leaks or seepage and longer gasket life.

WRITE TODAY FOR SAMPLES

Accopac materials come in sheets, rolls, ribbons, or die-cut shapes. If you cut or use fiber gaskets, investigate Accopac. We'll gladly supply samples for testing. Just call your Armstrong representative or write to Armstrong Cork Co., Industrial Div., 5808 Arch St., Lancaster, Penna.

*Well-Cast



COMMERCIAL LIGHTWEIGHT CASTINGS

Your commercial requirements for lightweight castings in aluminum or magnesium may be tough, but we'd welcome an opportunity to look them over. We've tackled a good many diversified casting problems over almost a half century.

Our four completely equipped plants and their trained personnel are at your disposal.

*Well-Cast

MILITARY LIGHTWEIGHT CASTINGS

Aircraft wheels, strut parts, engine parts and miscellaneous components are being made every day at our plants, in aluminum and magnesium. X-Ray inspection, close attention to detail, complete facilities for production in sand, semi-permanent and permanent mold form.

Well-Made Wood and Metal Patterns.
Well-Cast Ampco Bronze Castings.

*Copyrighted Trade Name.

If you would like to receive the Wellman Magazine each month without charge, drop us a note on your business letterhead.

THE WELLMAN BRONZE & ALUMINUM CO.

DEPT. 3, 12800 SHAKER BLVD., CLEVELAND 20, OHIO

(*Continued from page* 126)

Chicago Pneumatic Tool Company, Philadelphia, Pa.
Drills—440—$32,047

Chrysler Corporation, Detroit, Mich.
Gun—2—$304,120
Engineering services—$668,180

The Cincinnati Bickford Tool Company, Cincinnati, Ohio
Drills—40—$734,320

Cincinnati Milling & Grinding Machine Co., Cincinnati, Ohio
Milling machines—20—$414,900
Milling machines—12—$295,259
Grinding machines—2—$53,660
Milling machine—1—$50,840
Hardening machine—2—$37,848
Milling machine—1—$26,461
Milling machine—1—$21,308

Cincinnati Milling & Grinding Machines, Inc., Cincinnati, Ohio
Milling machine—2—$37,823
Milling machines—20—$93,270
Grinding machines—41—$464,882
Milling machine—2—$59,691
Milling machine—1 ea—$31,634
Milling attachment—1 ea—$1,307
Milling attachment—1 ea—$1,055
Milling machine—1 ea—$12,660
Milling machine—1 ea—$23,549
Milling machine—1 ea—$14,478

The Cincinnati Shaper Co., Cincinnati, Ohio
Brake press—1—$56,225
Brake press—2—$27,496

Clark Equipment Co., Cattle Creek, Mich.
Spare parts—var—$52,762
Spare parts—var—$132,373
Spare parts—$27,940
Spare parts—var—$57,032
Block assembly—245 ea—$36,343
Spare parts—var—$46,668

Clearing Machine Corp., Chicago, Ill.
Mechanical press—5—$75,500

Cleveland Diesel Engine Div., General Motors Corp., Cleveland, Ohio
Engine parts—job—$29,877
Repair parts—192—$26,804
Repair parts—180,125—$509,110

Colonial Broach Co., Detroit, Mich.
Broaching machines—2—$30,270

Consolidated Machine Tool Corporation, Rochester, N. Y.
Lathe—10—undetermined
Lathe—20—undetermined

Continental Aviation & Eng. Corp., Detroit, Mich.
Spare parts—$40,000

Continental Engine Co., Aircraft Engine Div., Muskegon, Mich.
Spare parts—$81,763

Continental Engine Co., Automotive Engine Div., Muskegon, Mich.
Spare parts—$57,147

Converto Mfg. Co., Cambridge City, Ind.
Semi-trailer—10 ea—$32,930

Cosa Corp., New York City, N. Y.
Gear grinder—1—$39,701

Crosley Motors Inc., Cincinnati, Ohio
Bomb shackle—9999 ea—$135,588

Cummins Engine Co., Inc., Columbus, Ind.
Repair parts—40,020—$120,225
Repair parts—615—$40,639

(*Turn to page* 132, *please*)

How a "talk in time" reduced the cost of an engine!

A large midwestern manufacturer of farm machinery was designing an engine. Things were pretty well settled and production schedules were set up. Right about this time I called on the Company and had a chat with the President. When he showed me the blueprints, I immediately saw how a casting, with which we had considerable experience, could effect a substantial economy. After a few minutes figuring I said, "We can make a casting that can save you real money." Although dubious, the President called in his engineers. We talked—analyzed—sketched. I suggested a test casting be made immediately. It was—it proved successful. Today every one of that Company's engines has this casting—and every engine costs less!

I am a Campbell, Wyant and Cannon Sales Engineer. I can offer you the same service—but don't wait until I call—call me!

CAMPBELL, WYANT AND CANNON
FOUNDRY COMPANY

Muskegon, Michigan • Telephone: Muskegon 3-1331

METALLURGICAL ENGINEERING provides unlimited possibilities in product design

PRECISION CONTROL assures the desired casting

MECHANIZATION to produce castings at reasonable cost

(*Continued from page* 130)

— D —

Dana Corporation, Toledo, Ohio
Vehicle parts—2400 ea—$27,617
Vehicle parts—22,737 ea—$93,267

Denman Rubber Mfg. Co., Warren, Ohio
Tires and tubes—3900 ea—$30,966

Detroit Diesel Engine Div., G. M. C., Detroit, Mich.
Spare parts—various—$123,739

Deubal Art. Tool & Machine Company, Detroit, Mich.
Vehicle parts—1100 ea—$30,360

The De Vilbiss Co., Toledo, Ohio
Crusher—76 ea—$31,996

Diamond T Motor Car Co., Chicago, Ill.
Truck, 5 ton—$24,946,239
Spare parts—5488—$61,517
Spare parts—36,678—$50,080

Dole Valve Co., Chicago, Ill.
Fuse—5400—$1,053,054

Douglas Aircraft Co., Inc., Santa Monica, Calif.
Spare parts—$150,000

E. I. Du Pont De Nemours & Company, Wilmington, Del.
Hydrogen peroxide—500,000—$223,500

— E —

Eclipse Machine Div., Bendix Aviattion Corp., Elmira, N. Y.
Carburetor—500—$64,885

Eclipse-Pioneer Div., Bendix Aviation Corp., Teterboro, N. J.
Synchros—40,000 ea—$2,446,500
Synchros—57,000 ea—$4,943,266
Spare parts—$116,002
Transmitters—$31,465
Instr maintenance parts—$38,820
Starters—191 ea—$104,542

The Electric Auto Lite Co., Port Huron, Mich.
Cable—606,000 ft—$38,390

The Electric Auto-Lite Co., Toledo, Ohio
Vehicle parts—47,300 ea—$141,802
Spark plugs—99,150 ea—$26,868

Electric Furnace Co., Salem, Ohio
Heat treating press—2—$29,220

Elliott Company, Inc., Ridgeway, Pa.
Motors—11—$1,616,735

The J. H. Elliott Co., Wash., D. C.
Milling machine—1—$81,057
Boring, milling, drilling machine—4—$153,674
Boring, milling, drilling machines—22—$840,160

— F —

Federal Motor Truck Co., Detroit, Mich.
Vehicle parts—6900 ea—$53,152

The Fellows Gear Shaper Company, Springfield, Vt.
Gear shapers—24—$273,724

Felters Company, Jackson, Mich.
Felt washers—271,804 ea—$34,008

Firestone Industrial Products Company, Akron, Ohio
Gas masks—174,087 ea—$281,130

Floyd Rice Sales & Service, Inc., Detroit, Mich.
Vehicle parts—5994 ea—$42,800

The Foote Company, Inc., Nunda, N. Y.
Spare parts—47 ea—$169,486

Ford Motor Co., Government Part Sales, Dearborn, Mich.
Spare parts—various—$51,451

Franklin Machine Products Co., Inc., West Trenton, N. J.
Lead assy—$69,300

— G —

Galion Iron Wks. & Mfg. Co., Galion, Ohio
Spare parts—various—$58,352

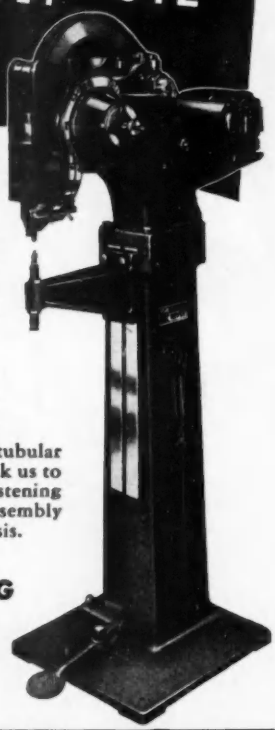
Gallmeyer & Livingston, Grand Rapids, Mich.
Grinder—39—$262,470

Gardner Denver Co., Chicago, Ill.
Digger—250 ea—$29,750
Digger—12 ea—$1,458
Digger—704 ea—$83,776
Digger—2 ea—$243

Gar Wood Ind., Findlay Div., Findlay, Ohio
Crane—3 ea—$56,347
Crane—6 ea—$107,178
Crane—12 ea—$231,312
Crane—19 ea—$362,069
Crane—6 ea—$148,836
Crane-shovel—19 ea—$566,352
Boom—19 ea—$21,907
Boom—24 ea—$26,482
Boom—20 ea—$3,460
Boom—22 ea—$3,769
Boom—7 ea—$1,183
Hook—13 ea—$1,846
Hook—24 ea—$3,408
Tagline—13 ea—$2,197
Shovel—1 ea—$2,585

(*Turn to page* 136, *please*)

Chicago RIVET "912"
AUTOMATIC RIVET SETTER
CUTS COSTS 3 WAYS



1 FASTENS FASTER . . .
Only the speed of the operator limits the 912's riveting speed. Completely automatic. A push on the foot pedal automatically feeds, inserts and clinches the rivet.

2 DOES WORK OF SEVERAL MACHINES
Quick change rotary hopper and raceway makes the 912 adjustable in 5 to 10 minutes to set different size rivets. Adjustable anvil height and 12-inch throat provide further versatility.

3 SAVES ON MAINTENANCE . . .
The 912 is massively built to stand the shocks of constant use and is designed for quick, easy servicing and parts replacement.

If your assembly calls for 3/16" steel tubular rivets or smaller, of ¾" lengths or less, ask us to show you how the 912 can cut your fastening costs. Send a sample of your problem assembly (or blueprint) for a free fastening analysis.

FREE CATALOG
contains valuable engineering information and rivet specifications plus illustrated descriptions of 26 Chicago Automatic Rivet Setters.

Chicago Rivet & MACHINE CO.
9612 West Jackson Boulevard, Bellwood (Chicago Suburb) Illinois
Branch Factory: Tyrone, Pa.

Metal Muscles for Modern Farmers

Push-button farming — with hydraulic tubular steel cylinders replacing weaker, less efficient human muscles — is but one of the many opportunities for improving design of plows, planters, drills, mowers, cultivators and other farm equipment, with OSTUCO Tubing.

Designers and engineers in the farm equipment industry, like those in many other fields, are finding OSTUCO Tubing ideal for cylinders, levers, handles, fuel lines, axles, spacers, bushings, bearings, and exhaust parts, to mention but a few of the applications.

They like OSTUCO Tubing for flexibility in design, great strength, light weight, good machinability, smooth finish, high quality, low cost.

We cannot always promise early delivery estimates on new civilian orders, because of military demands, but it will pay you to consult our experienced engineers about OSTUCO Tubing when redesigning your products to meet future competition.

From Your Blueprint . . . to Your Product
OSTUCO TUBING
Tapering • Swaging • Flanging • Bending
Upsetting • Expanding • Reducing • Beading
End closing • Spinning • Drilling • Slotting
Notching • Flattening • Shaping • Trimming
Threading • Angle Cutting • And Many Others

THE OHIO SEAMLESS TUBE COMPANY

Manufacturers and Fabricators of Seamless and Electric Welded Steel Tubing

Plant and General Offices: SHELBY, OHIO

OSTUCO SHELBY, OHIO

SALES OFFICES: Birmingham, P. O. Box 2021 • Chicago, Civic Opera Bldg., 20 N. Wacker Dr. Cleveland, 1328 Citizens Bldg. • Dayton, 511 Salem Ave. • Detroit, 520 W. Eight Mile Road, Ferndale • Houston, 6833 Avenue W, Central Park • Los Angeles, Suite 300-170 So. Beverly Drive, Beverly Hills • Moline, 617 15th St. • New York, 70 East 45th St. • Philadelphia, 1613 Packard Bldg., 15th & Chestnut • Pittsburgh, 1206 Pinewood Drive • St. Louis, 1230 North Main St. • Seattle, 3104 Smith Tower • Syracuse, 501 Roberts Ave. • Tulsa, 733 Kennedy Bldg. • Wichita, 622 E. Third St. • *Canadian Representative:* Railway & Power Corp., Ltd.

Friction material problem?

R/M BELONGS IN YOUR PICTURE!

"STOP-AND-GO" IS OUR BUSINESS!

Maybe you don't make tractors or combines or other types of farm equipment... but *whatever* your problems in brakes and clutches, you can count on RAYBESTOS-MANHATTAN for specialized friction materials that will do for you what R/M products do for farm machinery manufacturers.

R/M leadership in friction materials is well recognized in dozens of industries. Take the automotive industry, for example: more cars, trucks and buses use R/M brake linings, clutch facings, and automatic transmission friction parts than any other make. Other examples of R/M leadership in friction materials are found in the construction equipment, oil drilling, and mine machinery fields.

Your R/M representative is ready to help you now. He can work from samples, from designs on paper, or from figures on horsepower developed, combined with desired performance characteristics. Behind him stand the full facilities of the world's largest maker of friction materials... with six great plants, their research departments, and their testing laboratories.

The opening of our new Wabash Division, Crawfordsville, Ind., provides expanded facilities for the manufacture of

SINTERED METAL FRICTION MATERIALS

R M

FIRST IN FRICTION

RAYBESTOS-MANHATTAN, INC.

EQUIPMENT SALES DIVISION 445 Lake Shore Drive, Chicago 11, Ill.

Detroit 2 Cleveland 14 Los Angeles 11

Factories: Bridgeport, Conn. Manheim, Pa. Passaic, N.J. No. Charleston, S.C. Crawfordsville, Ind. Canadian Raybestos Co. Ltd., Peterborough, Ont.

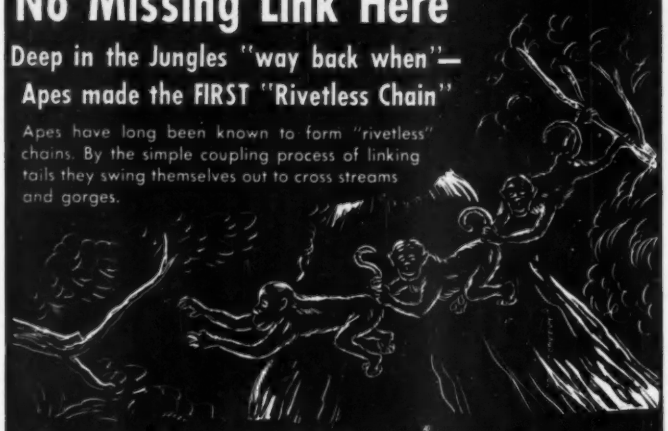
RAYBESTOS-MANHATTAN, INC., Manufacturers of Brake Linings • Brake Blocks • Clutch Facings Fan Belts • Radiator Hose • Industrial Rubber Products • Rubber Covered Equipment • Mechanical Packings • Asbestos Textiles • Sintered Metal Products • Abrasive and Diamond Wheels • Bowling Balls

R/M

No Missing Link Here

Deep in the Jungles "way back when"— Apes made the FIRST "Rivetless Chain"

Apes have long been known to form "rivetless" chains. By the simple coupling process of linking tails they swing themselves out to cross streams and gorges.



Drop-Forged Rivetless Chain another FIRST by JERVIS B. WEBB COMPANY

Proved by years of dependable service is the Drop-Forged Rivetless Chain, first developed by Jervis B. Webb Company for Trolley Conveyors. Simple and strong, it is cheaper and lighter per unit of ultimate strength than any other type of conveyor chain. It can be installed or removed by unskilled labor. Having no rivets, welds or bolts, it requires no special or joining links and may be disconnected at any point, yet it is so designed that it cannot become disconnected while in service.

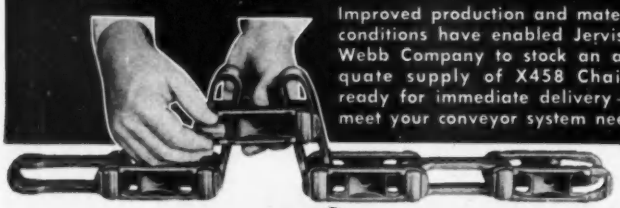
The No. X458 Chain (illustrated below) is completely interchangeable with the Webb FIRST — the original No. 458 Chain designed in the early Twenties by Mr. Jervis B. Webb. X458 Chain has the improved webbed side link which substantially stiffens it, preventing telescoping while in service.

Need Conveyor Chain? NOW

We're In Position To Make

IMMEDIATE DELIVERY

X458 Drop-Forged Rivetless Conveyor Chain



Improved production and material conditions have enabled Jervis B. Webb Company to stock an adequate supply of X458 Chain — ready for immediate delivery — to meet your conveyor system needs.

CONVEYOR ENGINEERS AND MANUFACTURERS

JERVIS B. WEBB COMPANY

8937 ALPINE AVE. DETROIT 4, MICH.

OFFICES IN PRINCIPAL CITIES

FACTORIES IN DETROIT . . . LOS ANGELES . . . HAMILTON, ONT.

(*Continued from page* 132)

Boom jib—10 ea—$4,810
Crane shovel—4 ea—$119,232
Boom—4 ea—$4,612
Hook—4 ea—$568
Crane shovel—3 ea—$105,779

Gar Wood Industries, Inc., Wayne, Mich.
Vehicle parts—11,680 ea—$40,445

General Electric Co., Los Angeles, Calif.
Station and equipment—1 lot—$66,540

General Electric Co., Louisville, Ky.
Switch gear and sub station—job—$114,252 and $125,548

General Electric Co., Philadelphia, Pa.
Maintenance parts—7196 ea—$50,790
Maintenance parts—150 ea—$59,375
Repair parts—57,985—$116,912

General Electric Co., Schenectady, N. Y.
Spare parts—$103,374
Maintenance parts—72 itm—$54,218

GMC/AC Spark Plug, Flint, Mich.
Vehicle parts—3000 ea—$32,250

General Motors Corp., Detroit, Mich.
Diesel engine—65—undetermined

GMC Truck & Coach Div., General Motors Corp., Pontiac, Mich.
Vehicle parts—11 ea—$83,490

General Motors Truck Co., Detroit, Mich.
Spare parts—$479,930

The General Tire & Rubber Company, Wabash, Ind.
Canisters—479,826—$602,365
Canisters, M11—87,500—related itms

Gerlinger Carrier Co., Dallas, Ore.
Trucks—100—$726,180

Giddings & Lewis Machine Company, Fond Du Lac, Wisc.
Planer—12 undetermined
Horizontal boring mill—10—undetermined

Giller Tool Supply Co., Dallas, Texas
Tool sets—20,000 sets—$767,800

Gisholt Machine Co., Madison, Wisc.
Lathe—40—$997,660
Lathes—3—$62,316
Lathe—1—$32,963
Lathes—8—$113,592
Lathes—50—$765,830
Lathes—4—$102,926
Machine—5—undetermined

The Goodyear Tire & Rubber Co., Inc., Akron, Ohio
Brake assembly—$144,254
Wheel assy—68 itms—$26,638
Brake—

Goshen Rubber Co., Inc., Goshen, Ind.
Gaskets—$25,638

Gould and Eberhardt, Inc., Irvington, N. J.
Shapers—36—$218,880

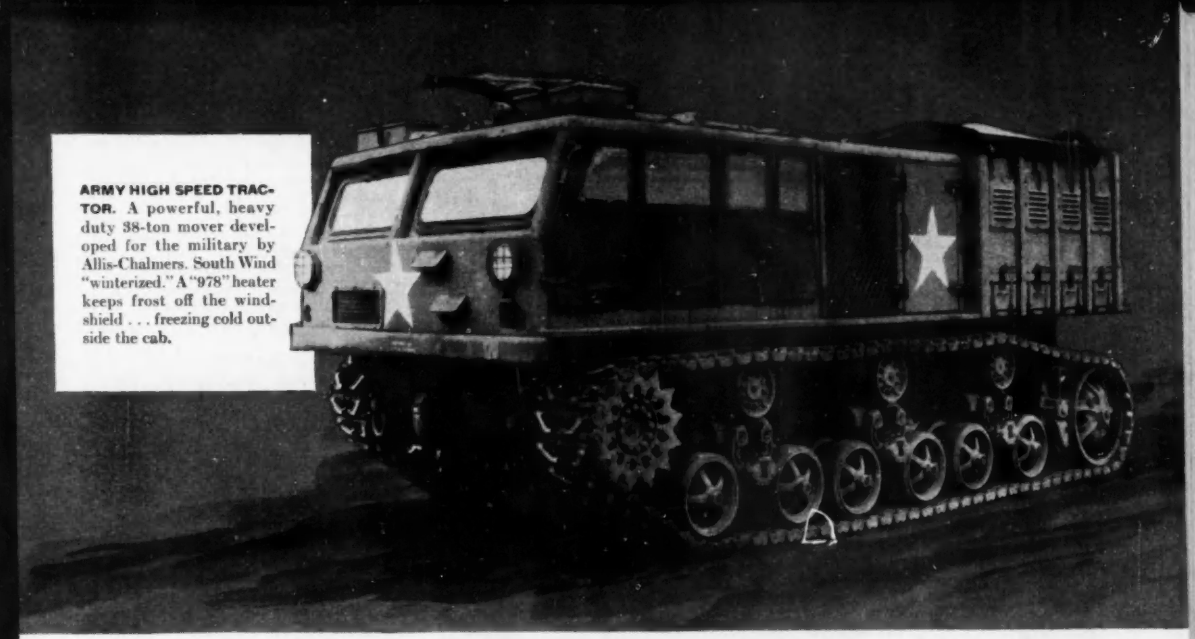
The G. A. Gray Co., Cincinnati, Ohio
Boring machine—2—$358,286
Planer—1—$47,740
Milling machine—10—undetermined
Planer—10
Planer—5

—H—

Hanson-Whitney, Co., Div. of the Whitney Chain Company, Hartford, Conn.
Milling machine—2—$32,758

Harley Davidson Motor Co., Milwaukee, Wisc.
Engine and transmission—215—$49,667

(*Turn to page* 138, *please*)



ARMY HIGH SPEED TRACTOR. A powerful, heavy duty 38-ton mover developed for the military by Allis-Chalmers. South Wind "winterized." A "978" heater keeps frost off the windshield . . . freezing cold outside the cab.

"NEW MILITARY HEATER KEEPS VEHICLES WARM EVEN AT 70° BELOW!"

These new Army vehicles boast increased personnel comfort, greater efficiency in sub-zero cold—all the results of an amazing new military heater: the South Wind "978."

Simplified in design. Compact. This rugged forced air heater preheats, heats, and defrosts in any type of military vehicle—in temperatures as low as 70° below zero. Dependably safe because the combustion air system is completely separated from the ventilating air stream. Always fast acting because warm air circulation doesn't depend on engine heat or engine operation.

Built to Army Ordnance specifications, the "978" has been standardized by the Army for its winterization program. And because of its many exclusive advantages, this new type heater promises to be influential in fashioning future designs for commercial car heating, too.

ACT NOW: Find out how this revolutionary new "978" military heater can effectively answer *your* vehicle heating and engine pre-heating requirements. Get the experienced counsel of a trained field engineer. Wire, write or phone Stewart-Warner Corporation, South Wind Division, 1514 Drover Street, Indianapolis 7, Indiana.

STEWART-WARNER *South Wind* REG. U. S. PAT. OFF.

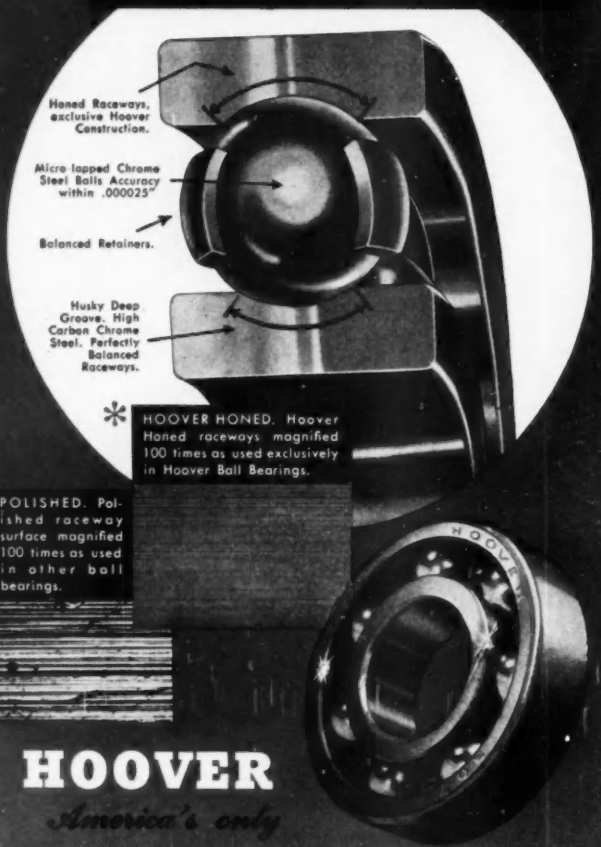
PERSONNEL HEATING
ENGINE AND EQUIPMENT PRE-HEATING
WINDSHIELD DEFROSTING

MIGHTY MOVER. The Army M4, 18-ton heated high speed tractor. A South Wind "978" heater dependably introduces fresh air to keep windshields completely frost-free, cab and personnel comfortably warm.

SELF-PROPELLED artillery. New M41 Motor Carriage with 155mm. Howitzer. Equipped with two South Wind "978's" for personnel heating, and for heating gun components.

Nothing is as smooth as a

HOOVER HONED RACEWAY*


Honed Raceways, exclusive Hoover Construction.
Micro lapped Chrome Steel Balls Accuracy within .000025"
Balanced Retainers.
Husky Deep Groove, High Carbon Chrome Steel. Perfectly Balanced Raceways.
* HOOVER HONED. Hoover Honed raceways magnified 100 times as used exclusively in Hoover Ball Bearings.
POLISHED. Polished raceway surface magnified 100 times as used in other ball bearings.

HOOVER

America's only

BALL BEARING

with Honed Raceways

90% longer life
30% greater load
amazing quietness

The Aristocrat of Bearings

HOOVER BALL AND BEARING CO.
Ann Arbor, Michigan

(*Continued from page* 136)

Harnischfeger Corp., Milwaukee, Wis.
Crane—1—$35,500
Bridge crane—1 ea—$36,870

Harvey Machine Co., Torrance, Calif.
Shell—$104,588
Shell—Over $250,000

Heald Mach. Co., Worcester, Mass.
Grinders—2—$55,380
Grinding machine—1—$27,120

The Heil Company, Milwaukee, Wis.
Spare parts—various—$44,891

The Hendey Machine Co., Torrington, Conn.
Lathes—45—$413,055

Hercules Motors Corp., Canton, Ohio
Vehicle parts—35,800 ea—$57,663
Vehicle parts—82,000 ea—$46,136
Vehicle parts—48,550 ea—$28,181

Hercules Powder Co., Wilmington, Dela.
Propellants & explosives $23,039,757

Hevi Duty Electric Co., Milwaukee, Wisconsin
Furnaces—7—$68,307

C. G. Hokanson Co., Los Angeles, Calif.
Trailer—38 ea—$287,242

Huron Metal Products Co., Brooklyn, N. Y.
Rocket adapters—864 ea—$49,118

Hyster Company, Portland, Oregon
Spare parts—var.—$52,600

—I—

Ingersoll-Rand Co., Chicago, Ill.
Drifter—188 ea—$334,181
Drill—133 ea—$33,529
Drill—92 ea—$23,193
Quarry Equipment—7 set—$57,305

Ingersoll-Rand Co., Los Angeles, Calif.
Repair parts—654 line itm—$211,770

Ingersoll-Rand Co., Philadelphia 3, Pa.
Repair parts—1371—$43,234

Ingersoll-Rand Co., Washington, D. C.
Compressor—10—Undetermined

Inland Steel Company, Chicago, Illinois
Steel—5,000 ton—$470,000

International Harvester, Melrose Park, Ill.
Tractor—18 ea—$41,334
Tractor—100 ea—$1,442,384
Spare parts—various—$169,269
Spare parts—various—$112,694

International Harvester Co., Wash., D. C.
Vehicle parts—31 ea—$47,770
Vehicle parts—36 ea—$166,549

International Harvester Co., West Pullman Wks., Chicago, Ill.
Fuze—6050—$1,208,767

—J—

Jack & Heintz, Inc., Cleveland, Ohio
Tachometer—1561 ea—$35,709
Generator—1672 ea—$46,506
Holder & brush assmb.—$89,987

F. L. Jacobs Company, Detroit, Michigan
Rocket motors—$58,400

Jered Engineering & Mfg. Company, Detroit, Michigan
Transmission work—9—$629,744

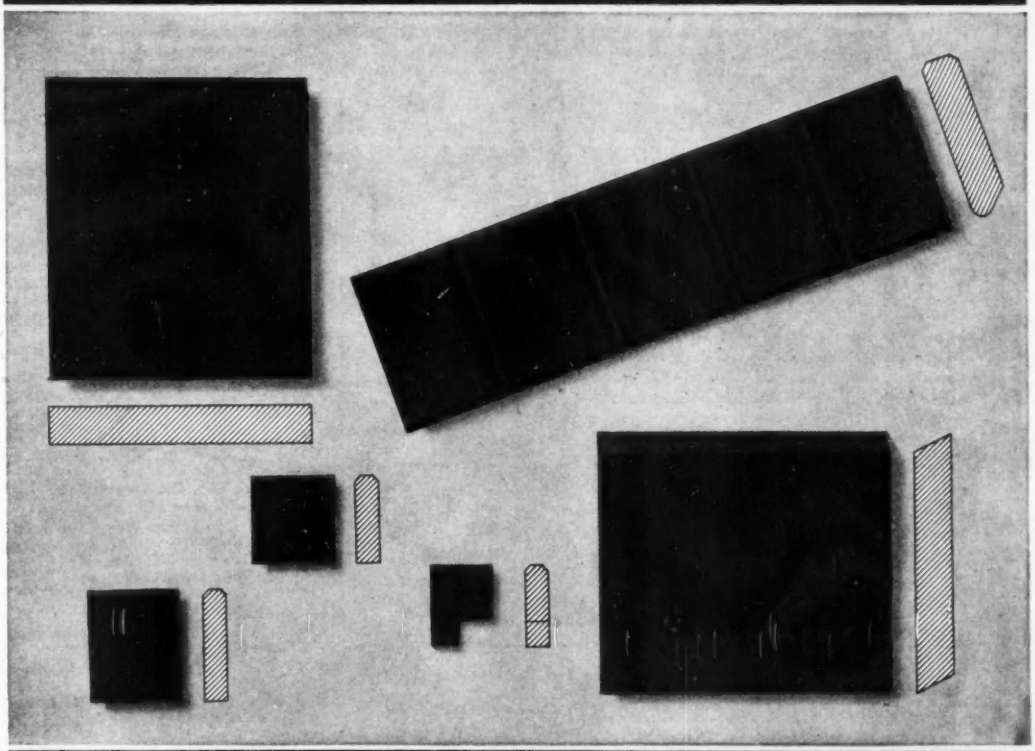
Jones & Lamson Machine Company, Springfield, Vermont
Lathe—4—$81,196
Lathes—5—$132,381
Contour comparator—9 ea—$59,289

(*Turn to page* 140, *please*)

For Superior Pump Performance...Specify

NATIONAL
TRADE-MARK

Carbon Rotor Vanes



ACCURATE FINISH • LOW FRICTION • DIMENSIONAL STABILITY • MECHANICAL STRENGTH •
HEAT RESISTANCE • SELF LUBRICATING • WEAR RESISTANCE • CORROSION RESISTANCE

LOW LIGHT BILLS...
mark phenomenal acceptance of "EVEREADY" No. 1050 Industrial Flashlight Batteries by a broad cross-section of industry. Delivering twice the usable light of any battery we've ever made before, it will not swell, stick or jam in the flashlight . . . has no metal can to leak or corrode.

● "National" Carbon Rotor Vanes for pumps and compressors are precisely machined and finished from a special carbon-base material which provides a combination of properties unmatched by any other kind of material for this service.

Precision machined to your blue-print specifications, "National" Rotor Vanes are your answer to tough operating problems such as corrosive liquids and gases, high temperatures, case-galling, warpage and other sources of frequent and costly maintenance.

Engineering assistance in the design and the application of "National" Rotor Vanes is available through our district offices listed below.

The terms "National" and "Eveready" are registered trade-marks of Union Carbide and Carbon Corporation

NATIONAL CARBON COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N. Y.

DISTRICT SALES OFFICES: ATLANTA, CHICAGO, DALLAS, KANSAS CITY, NEW YORK
PITTSBURGH, SAN FRANCISCO
IN CANADA: NATIONAL CARBON LIMITED • MONTREAL, TORONTO, WINNIPEG

CANNON PLUG ACCESSORIES

for the "AN" Series

Here is the answer to a frequent question we receive from people everywhere. Yes, Cannon *does* make a complete line of accessories to be used in conjunction with the AN Series of connectors. Complete engineering data on each of these is given in the Cannon AN Bulletin, available on request.

CANNON ELECTRIC

Since 1915

Factories in Los Angeles, Toronto, New Haven, Benton Harbor. Representatives in principal cities. Address inquiries to Cannon Electric Company, Dept. H-126, P. O. Box 75, Lincoln Heights Station, Los Angeles 31, California.

(*Continued from page* 138)

—K—

Kay & Burbank, Los Angeles, Calif.
Repair parts—94—$46,967

Kaydon Engineering Corp., Muskegon, Mich.
Grinding machine—1—$42,410

Kearney & Trecker Corp., Milwaukee, Wisconsin
Milling machine—36—$358,020
Milling machine—38—$536,788
Milling machines—2—$39,188
Milling machine—38—$536,788
Milling machines—2—$39,188
Milling machines—6—$117,998

King Machine Tool Div., American Steel Foundries, Cincinnati, Ohio
Boring and turning mill—21—Undetermined

The E. A. Kinsey Co., Cincinnati, Ohio
Boring mill—2 ea—$135,425
Lathe—5 ea—$275,762

Klauer Mfg. Co., Dubuque, Iowa
Spare parts—various—$25,580

Knuckey Truck Co., San Francisco, Calif.
Dynamometer—1 ea—$24,503
Trailer—1 ea—$11,970

Koehring Co., Milwaukee, Wisc.
Spare parts—various—$80,454

—L—

Lake Shore Eng. Co., Detroit, Mich.
Plate—599 ea—$104,549

Landis Tool Company, Waynesboro, Pa.
Grinder—3—$33,774
Grinding machines—2—$38,794
Grinding machines—2—$30,566
Grinding machines—1—$27,868
Grinding machines—1—$26,448

Henry G. Lange Machine Works, Inc., Chicago, Ill.
Edging & grinding machine—60 ea—$48,090

The R. H. LeBlond Machine Tool Co., Cincinnati, Ohio
Lathes—130 ea—$917,152

Le Roi Company, Milwaukee, Wisconsin
Compressors—9 ea—$50,544
Compressor—30 ea—$108,975
Spare parts—various—$157,363

Lesaman Mfg. Co., Des Moines, Iowa
Tractor—6 ea—$27,660

R. G. LeTourneau, Inc., Peoria, Ill.
Spare parts—various—$59,158

Linde Air Products Co., Union Carbide & Carbon Corp., New York, N. Y.
Cutting machine—10 ea—$67,625

Lipe-Rollway Corp., Syracuse, N. Y.
Vehicle parts—220 ea—$81,356

Livingston's Machine & Tool Company, Frostburg, Md.
Igniter supports—251,804 ea—$25,180

Lloyd & Arms, Inc., Philadelphia, Pa.
Grinders—3—$39,900
Honing and lapping machine—1—$43,985

The Lodge & Shipley Co., Cincinnati, Ohio
Lathe—2—$50,708
Lathes—20—$344,600
Lathe—20—$192,400

Lord Mfg. Co., Erie 6, Pa.
Maintenance parts—8205 ea—$346,980
Engine mounts—$140,094

(*Turn to page* 142, *please*)

IF TINY PRECIOUS METAL CONTACTS ARE A TOUGH ASSEMBLY PROBLEM...

Look to Mallory for economical production

The assembling of tiny contacts of platinum, palladium or other precious metals no longer need bottleneck your production or push manufacturing costs out of line. Through modern tape-welding techniques, Mallory is mass-producing millions of assemblies like those illustrated here, and at low cost!

This process employs a tape of contact material—either solid, or bi-metallic with a facing of a few thousandths of precious metal. The tape is fed into a machine that shapes the contact, welds it in place and ejects the assembly—as a continuous, automatic operation.

This process *reduces costs* and *improves performance* because it eliminates individual handling, less precious metal is required and the welded assembly provides excellent conductivity and physical strength.

Expect More...
Get More From Mallory

Whether your electrical contacts are large or small, Mallory can produce them for you to the highest quality standards—and at the right price.

Your own organization is freed of all problems of purchasing, stocking and fabrication of contact materials and subassemblies. And you benefit by Mallory's single responsibility for the complete job . . . extending from raw materials to final inspection.

Write or call Mallory today about your contact requirements.

In Canada, made and sold by Johnson Matthey & Mallory, Ltd., 110 Industry St., Toronto 15, Ontario

Electrical Contacts and Contact Assemblies

P. R. MALLORY & CO. Inc.

MALLORY

SERVING INDUSTRY WITH THESE PRODUCTS:

Electromechanical—Resistors • Switches • Television Tuners • Vibrators
Electrochemical—Capacitors • Rectifiers • Mercury Dry Batteries
Metallurgical—Contacts • Special Metals and Ceramics • Welding Materials

P. R. MALLORY & CO., INC., INDIANAPOLIS 6, INDIANA

For information on titanium developments, contact Mallory-Sharon Titanium Corp., Niles, Ohio.

For the Best . . Call Cleveland!

CLEVELAND CONTAINER PLUGS SLEEVES CAPS ARE OF EVER INCREASING IMPORTANCE TO THE MANUFACTURER.

Illustrated

for paint spray protection.

PLUGS to seal off the speedometer hole . . .

to plug up an oblong hole on the manifold assembly.

to slip over the carburetor opening . . .

a masking protector on fuel pumps . . .

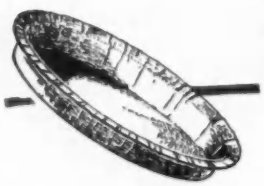
to protect against dust, dirt and lint . . . in storage or in transit to installation.

We design and produce them to meet the most exacting needs.

Our Plugs and Sleeves obtainable in diameters from 1/8 inch up. Caps from 1/4 inch up.

Special Sizes and Shapes to meet YOUR needs.

* * *

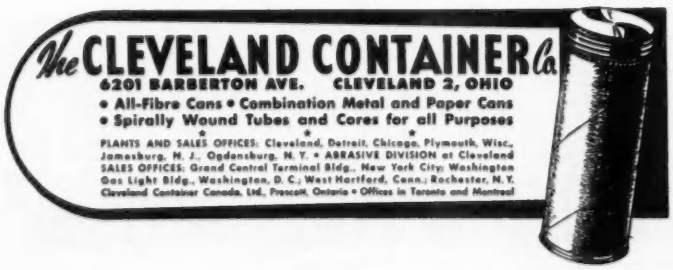


Also available . . . Chemically Treated Plugs with added strength and stiffness . . . with proper resilience to ensure a clean, tight, dust-proof fit.

Grease proof . . . low moisture absorption . . . noninflammable . . . and are stable up to 260° Fahrenheit.

• • •

Attractive Prices! Quick Deliveries!
Consult us on your needs.



The CLEVELAND CONTAINER Co.
6201 BARBERTON AVE. CLEVELAND 2, OHIO
• All-Fibre Cans • Combination Metal and Paper Cans
• Spirally Wound Tubes and Cores for all Purposes

PLANTS AND SALES OFFICES: Cleveland, Detroit, Chicago, Plymouth, Wisc., Jamesburg, N. J., Ogdensburg, N. Y. • ABRASIVE DIVISION at Cleveland SALES OFFICES: Grand Central Terminal Bldg., New York City; Washington Gas Light Bldg., Washington, D. C.; West Hartford, Conn.; Rochester, N. Y. Cleveland Container Canada, Ltd., Prescott, Ontario • Offices in Toronto and Montreal

(*Continued from page* 140)

Edward A. Lynch Machinery Company, Wynnewood, Pa.
Forming machine—1—$28,288

—M—

Machinery Associates, Inc., Philadelphia, Pa.
Lathes—40—$275,960
Lathe—1—$29,834
Lathe—1 ea—$12,045
Lathe—1 ea—$14,308

Madison Muffler Co., Long Island City, New York
Muffler—64 ea—$45,056

Magnesium Co. of America, East Chicago, Ind.
Container assembly—553 ea—$56,936

Mall Tool Co., Chicago, Ill.
Saw—100 ea—$30,500
Saw—46 ea—$14,030

P. R. Mallory Co., Inc., Indianapolis, Indiana
Power supplies—460 ea—$96,641
Bomb release control—1457 ea—$139,091

Manitowoc Engineering Works, Manitowoc, Wisconsin
Repair parts—215 line itm—$107,595

Manley Div., American Chain & Cable Co., Inc., York, Pa.
Tire spreader—224 ea—$25,118

Marion Power & Shovel Co., Marion, Ohio
Repair parts—415 line itm—$268,781
Repair parts—125 line itm—$283,329

The Maxim Silencer Co., Hartford, Conn.
Exhaust mufflers—90—$30,870

Mechanics Universal Joint Division, Borg-Warner Corp., Rockford, Illinois
Vehicle parts—5200 ea—$33,579

Mesta Machine Co., Pittsburgh, Pa.
Forging press—1—$450,000

The Midvale Co., Nicetown, Philadelphia 40, Pa.
Armor plate—31—over $250,000

Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Indicator—$1,500,000

Minneapolis-Moline Co., Minneapolis, Minn.
Shells—1,760,000 shells—$13,024
Tractor—25 ea—$44,232

The Mohawk Rubber Co., Akron, Ohio
Tires and tubes—4000 ea—$880,865

Monowatt Dept. of General Electric Co., Providence, R. I.
Electrical connectors — 2,208,000 ea—$595,719

Moore Machinery Co., Los Angeles, Calif.
Lathe and equipment—22 ea—$27,174

Morris Machine Wks., Baldwinsville, N. Y.
Repair parts—178—$66,967

—N—

National Acme Co., Worcester, Mass.
Chucking machine—359—$25,739

National Broach & Machine Company, Detroit, Michigan
Gear shaver—4—Undetermined
Gear shaver—4

National Machine & Tool Company, Jackson, Michigan
Tool sets—400—$39,780

(*Turn to page* 146, *please*)

SUN TEST STANDS FOR USE IN ASSEMBLY BRANCHES OF LARGE CAR MANUFACTURER

car, truck and tractor factories

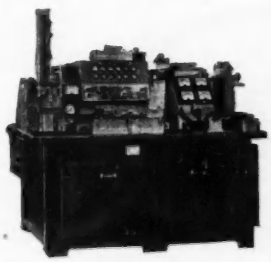
engine builders

component parts manufacturers

eliminate headaches
save thousands of dollars
by
TEST BEFORE DELIVERY

SUN
makes it easier
for you

...with special-order, built-to-specification scientific test equipment



Stations are provided for several men to work simultaneously in testing:

- Generator Regulator
- Ignition Coil
- Fuel Level Indicator
- Oil Pressure Indicator
- Temperature Indicator
- Charge Indicator
- Oil Pressure Sender
- Distributor Tests
- Fuel Gauge Tank Unit
- Generator
- Starting Motor Assembly
- Heat Indicator Bulbs
- Thermostat Temperatures
- Armatures
- Thermostat Leakage

In car, truck and tractor factories and assembly plants; in engine plants and in the factories of component parts manufacturers, SUN Equipment is being used in production testing, spot checking and in Material Return rooms.

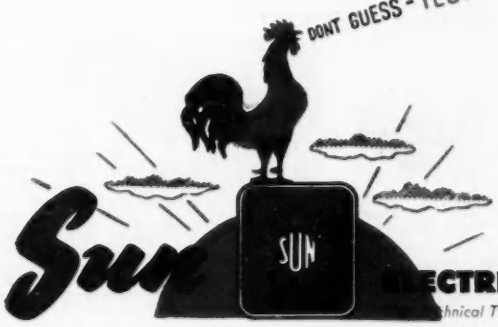
The testing of electrical and other engine accessories, under service conditions, to determine compliance with factory specifications, is a high-speed, simplified operation on SUN Electrical Test Stands. SUN Test Stands are saving innumerable dollars for manufacturers. In many vehicle factories and assembly branches, electrical and other engine parts and systems are being tested on SUN Equipment *before* they are installed on new vehicles.

In Material Return rooms SUN Test Stands are separating the good from the bad.

Among Engine Builders, SUN Test Stands are popular for determining engine performance on equipment identical to that used at the car factory.

Component Parts Manufacturers are finding it advantageous to use the same kind of SUN Equipment the vehicle factory uses.

Tell us your problems and we will be glad to discuss the design of special test equipment for your particular need.

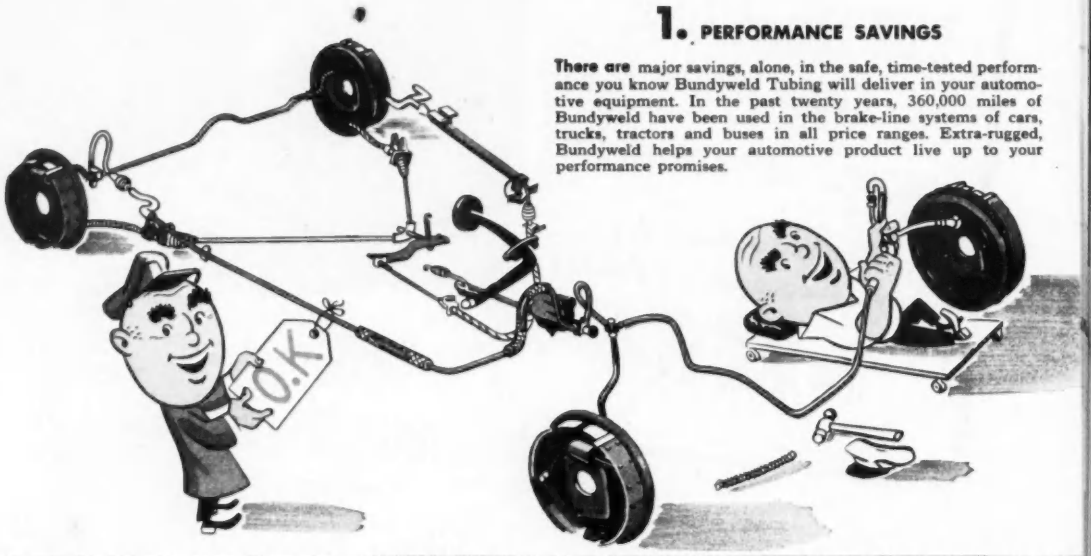


SUN ELECTRIC CORPORATION
6373 AVONDALE AVENUE
CHICAGO 31, ILLINOIS

Technical Training Schools in 16 cities, Night and Day Courses.

B5851

On every count, your greatest



1. PERFORMANCE SAVINGS

There are major savings, alone, in the safe, time-tested performance you know Bundyweld Tubing will deliver in your automotive equipment. In the past twenty years, 360,000 miles of Bundyweld have been used in the brake-line systems of cars, trucks, tractors and buses in all price ranges. Extra-rugged, Bundyweld helps your automotive product live up to your performance promises.

2. FABRICATION SAVINGS

Once your designers work out new tubing parts, trust Bundy to come up with the fastest, most practical way to produce them. You save, because Bundy can run with the ball, turn out parts that help achieve your engineering, design or performance objectives. Typical of Bundy-created parts is the hydraulic line, above, for automatic car-window lifts.

Bundyweld® Tubing

DOUBLE-WALLED FROM A SINGLE STRIP

WHY BUNDYWELD IS BETTER TUBING

Bundyweld starts as a single strip of copper-coated steel. Then it's . . .

continuously rolled twice around laterally into a tube of uniform thickness, and

passed through a furnace. Copper coating fuses with steel. Presto . . .

Bundyweld, double-walled and brazed through 360° of wall contact.

← **NOTE** the exclusive patented Bundyweld beveled edges, which afford a smoother joint, absence of bead and less chance for any leakage.

Bundy Tubing Distributors and Representatives: *Cambridge 42, Mass.:* Austin-Hastings Co., Inc., 226 Binney St. • ***Chattanooga 2, Tenn.:*** Peirson-Deakins Co., 823-824 Chattanooga Bank Bldg. • ***Chicago 32, Ill.:*** Lapham-Hickey Co., 3333 W. 47th Place • ***Elizabeth, New Jersey:*** A. B. Murray Co., Inc., Post Office Box 476 • ***Philadelphia 3, Penn.:*** Rutan & Co., 1717 Sansom St. • ***San Francisco 10, Calif.:*** Pacific Metals Co., Ltd., 3100 19th St. • ***Seattle 4, Wash.:*** Eagle Metals Co., 4755 First Ave. South ***Toronto 5, Ontario, Canada:*** Alloy Metal Sales, Ltd., 181 Fleet St., East • **Bundyweld nickel and Monel tubing is sold by distributors of nickel and nickel alloys in principal cities.**

automotive tubing buy

Specify Bundyweld Tubing and you buy time-proved, safe performance, priceless in itself. You buy tubing features without parallel, backed by engineering skills *dedicated* to cutting costs.

Measure all that you buy in Bundyweld Tubing against the performance standards and cost requirements you set for brake lines, oil lines, and other automotive tubing parts.

You buy safety. Since 1930, over a third of a million miles of Bundyweld Tubing have been used in brake lines of cars, trucks, buses, and tractors of all prices, kinds, and types. Billions of miles traveled by these vehicles prove Bundyweld's safety.

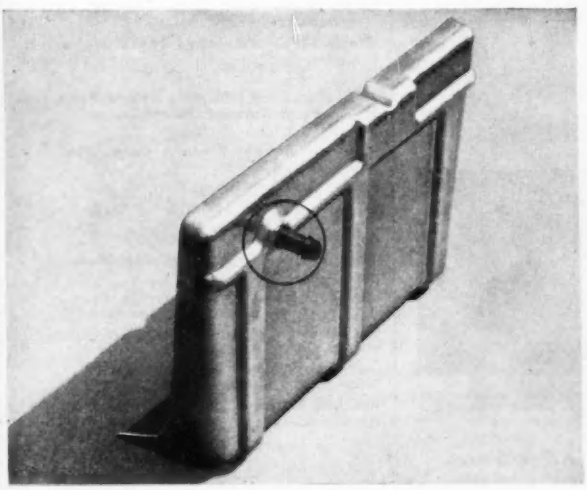
You buy tubing features without parallel. Bundyweld is the only tubing double-walled from a single strip, copper-brazed through 360° of wall contact. It's extra-sturdy, extra-strong; has high bursting strength, high resistance to severe shock and vibration fatigue.

You buy the industry's finest engineering skills, which can mean major savings in the long run. Bundy men called in during critical design and planning phase are often able to bring about major savings in materials, tooling costs, or production time at that point.

Then, promptly, and *as specified*, Bundyweld rolls into your production lines—either fabricated by Bundy or in lightweight coils and lengths for easy, economical fabrication by your men.

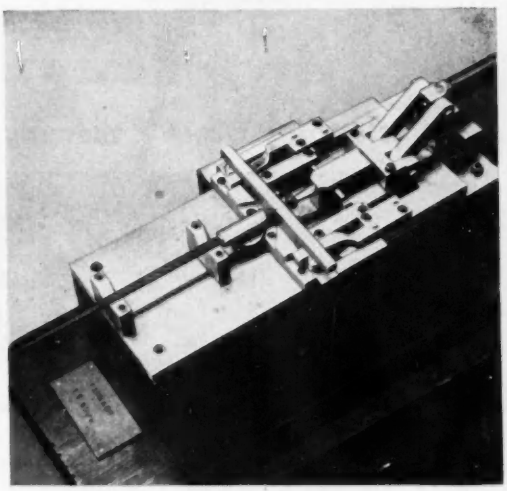
Price-minded, performance-minded automotive engineers know there is no adequate substitute for Bundyweld Tubing. *Or* for Bundy skills.

Contact a Bundyweld Distributor (listed lower left), or write direct to *Bundy Tubing Company, Detroit 14, Michigan*



3. COSTS CUT

You save through constant efforts inside Bundy to ferret out better, faster, more economical production methods. Example: Special burring operation on drain tube (circled) in battery tray, above, has now been eliminated by an improved production technique, and savings passed on to Bundy customer in lowered costs per unit. For *true* economy in automotive tubing parts, specify Bundyweld!



4. MORE PRODUCTION SAVINGS

Bundy-built assembler, above, demonstrates more typical Bundy production advances. Assembler automatically slips rubber washer over bead at end of tube, eliminates former expensive hand operation, speeds output at appreciably lower cost, which Bundy customer shares. Look into the ultimate cost of tubing; count by count, you'll find Bundyweld is your finest tubing "buy."

GET DUMORE

the drill head with automatic built-in controls

Self-Contained Air
No cumbersome air lines to hook up. Simply plug into electrical outlet. Built-in rotary air compressor advances drill at *required* speed and feed for *new resistance drilling*.

New Resistance Drilling
Provides completely automatic operation. Self-compensating control of drill by combined action of Air Feed Pressure Regulator and built-in return spring allows material being drilled to govern rate of drill feed and speed.

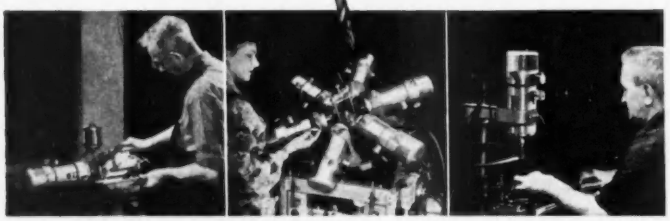
Adjustable Stroke Control
Select depth of stroke by adjustable stop nuts. Allows *measured depth* drilling from 1/32" to 1-1/8". Can be controlled to .004" preciseness.

Air Feed Pressure Regulator
Permits adjustment of pressure up to 15 P.S.I. Allows for variation in drill size. This simple control governs rate of drill advancement in work.

Automatic Chip Clearance
Depth Staging feature provides retraction of drill at proper intervals for chip clearance. Prevents drill breakthrough, practically eliminates costly drill breakage.

Maximum Drilling Production
Automatic operation of drill allows free use of operator's hands. Fast, one-time setup makes this machine ideal for simultaneous operations.

and get all these cost reducing benefits



Motor manufacturer doubled output on armature shaft drilling. Decreased drill breakage 25 times.

Unusual setup drills bronze nozzle holders. Labor costs slashed $75 on first run of 5273 pieces.

Sound equipment manufacturer cashed in on big savings. Cut drill breakage to the bone.

With the Dumore automatic drill head, you can say goodbye to excessive drill breakage, down time and scrap loss on small diameter, deep hole drilling. And just as important, you *increase* drilling capacity.

Get all the information about this revolutionary tool. Ask for demonstration. See how it eliminates operator guesswork and provides completely automatic control, flexibility of setup, big cost reductions at desirably low cost.

Call your distributor today, or write for bulletin.

THE DUMORE COMPANY
1309 Seventeenth Street • Racine, Wisconsin

(*Continued from page* 142)

The National Supply Co., Torrance, Calif.
Tube forgings—over $250,000
Tube forgings—$83,139
Tube forgings—over $250,000

New-Britain-Gridley Machine Division, The New Britain Machine Company, New Britain, Conn.
Chucking machine—2—$72,700
Chucking machines—10—$254,290

The New Britain Machine Company, New Britain, Conn.
Wrench sets and wrenches—15,835 set, 28,100—$68,361

North American Aviation, Inc., Los Angeles, Calif.
Aircraft—11 ea—$170,918

Northrop Aircraft, Inc., Hawthorne, Cal.
Range finders T46—over $250,000
Computer—$99,000

Norton Company, Worcester, Mass.
Grinding machines—30—$364,410
Grinders—6—$146,792

—O—

Oerlikon Machine Tool Works, Buehrle & Company, Zurich, Switzerland
Aircraft revolver gun—50 ea—$757,810

D. W. Onan & Sons, Minneapolis, Minn.
Spare parts—var—$32,782
Spare parts—$78,586

—P—

The Peck, Stow & Wilcox Company, Southington, Conn.
Wrenches—63,288—$58,773

Pennsylvania Rubber Co., Mansfield, Ohio
Tires—512 ea—$68,669

Pettibone-Mulliken Corp., Chicago, Ill.
Tractors—12 ea—$104,615

Plomb Tool Company, Los Angeles, California
Wrenches—71,687—$45,441

Pratt & Whitney Div., Niles-Bement-Pond Co., West Hartford, Conn.
Milling machine—5—$85,815

Precision Rubber Products Corp., Dayton, Ohio
Rings—$102,625

—R—

Reed Prentice Corp., Worcester, Mass.
Lathe—8—$78,414

Reynolds Metals Co., Louisville, Ky.
Aluminum sheet—1025000 lbs—$419,572

Ridgewood Ordnance, Inc., Cincinnati, Ohio
Tube forgings—2390—$3,666,260
Tube forgings—630—$3,533,200

Rockford Machine Tool Co., Rockford, Ill.
Slotter—15—$311,820

—S—

Saginaw Products Corp., Elmira, N. Y.
Vehicle parts—8000 ea—$43,840

George H. Schuman Co., Inc., Baltimore 12, Md.
Jet fueling system—$27,200

Schwien Engineering Co., Van Nuys, Calif.
Synchros—$35,000

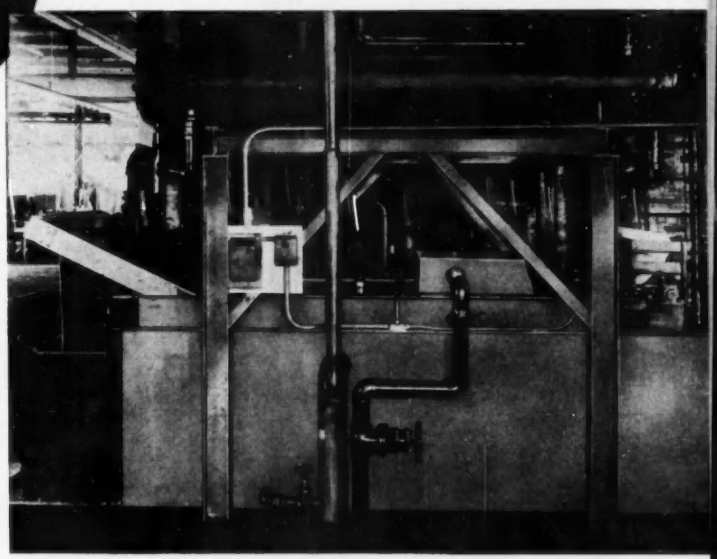
Scott Aviation Corp., Lancaster, N. Y.
Regulators—6700 ea—$394,295

(*Turn to page* 148, *please*)

Delpark FILTERS

Quenching Oil

...AT Chain Belt OF MILWAUKEE



★ In the plant at Chain Belt Company, in order to obtain better control of the quench oil properties, a Delpark Filter has been installed to eliminate the breakdown products of the quench oil in addition to the scale and carbon soot carried in the oil by their heat treating operations. It has been found that this filtering unit is definitely removing these foreign matters, thus enabling them to maintain more uniform viscosity and lowering their maintenance costs. This lower cost is brought about by the fact that there is less accumulation of foreign matters in their heat exchangers and settling tanks.

With approximately 12,000 gallons of oil in the entire system, the Delpark Industrial Filter, by pumping 50 gallons per minute, assures a complete change of oil once every four hours. In the span of an 8-hour day, 24,000 gallons of oil are filtered at an approximate cost of $1.20 per day for filter media.

There's a Delpark Industrial Filter to fit your requirements. Let a Delpark Industrial Filtering Specialist show you the facts on the finest in Industrial filtration. Write for more complete information.

PATENTS PENDING

Delpark

INDUSTRIAL FILTRATION

Backed by 30 Years Experience in Industrial Filtration

INDUSTRIAL FILTRATION CO. [illegible] LEBANON, INDIANA

BROKEN TAPS *Removed!*

TOOL & DIE *Repairs!*

REPORTED:

$70,000.00 in savings every year in Tool and Die Repair alone from only two Thomas Metalmasters in the world's largest cash register manufacturing plant.

REPORTED:

Terrific drop in scrap loss per man from $35.00 per man to $8.00 per man with the use of 14 Thomas Metalmasters in the world's largest Aircraft engine manufacturing plant.

With the Thomas Metalmaster Disintegrator you'll actually remove broken tap cores in minutes with no fuss—no bother—no toil . . . PLUS the fact that you'll not injure or effect the temper of the workpiece.

For technical information relative to metal disintegration via the TM way send for your copy of the Thomas Metalmaster Technical Bulletin published monthly in the interest of metal disintegration advancement. This is the only complete and reliable source on metal disintegration available in the world. Direct reports monthly of our findings and advancements right from our own complete Research Laboratories.

Write today on your company letterhead to

METALMASTER
DIVISION OF THE CLINTON MACHINE COMPANY
CLINTON, MICHIGAN

There's a factory trained technical engineer in your area ready to give you a free demonstration in your own plant

(*Continued from page* 146)

Seneca Falls Mach. Co., Seneca Falls, N. Y.
Lathe—1—$33,362
W. E. Shipley Machinery Company, Philadelphia, Pa.
Lathe—20—$230,114
Lathes—6—$116,274
The Sidney Machine Tool Company, Sidney, Ohio
Lathes—10—$186,266
Skinner Purifiers Div., Bendix Aviation Corp., Detroit, Mich.
Fuel filter—$232,480
A. O. Smith Corp., Pacific Coast Div., Los Angeles, Calif.
Screen Assy.—1000 ea—$30,435
Sperry Gyroscope Co. Div., Sperry Corp., Great Neck, N. Y.
Aircraft instruments—11 ea—$191,677
Spare parts—55 ea—$994,957
Assemblies—$500,000
Spare parts—$1,000,000
Springfield Machine Tool Co., Springfield, Ohio
Grinders—2—$113,032
Standard Forge & Axle Co., Inc., Montgomery, Ala.
Spare parts—$26,565
Stedfast & Roulston, Inc., Boston, Mass.
Milling machine—1 ea—$35,677
Studebaker Corp., South Bend, Ind.
Trucks and spare parts—429—$3,144,127
Swind Machine Co., Philadelphia, Pa.
Lathe engines—6—$286,395
Sylvania Electric Products, Inc., Washington, D. C.
Fuze tubes—$5,682,925

—T—

Tacony Rubber Products Corp., Conshohocken, Pa.
Gaskets—750,000 ea—$114,470
Titeflex, Inc., Newark, N. J.
Ignition spare parts—$26,568
Towmotor Corp., Cleveland, Ohio
Trucks—106—$416,210

—U—

Union Switch & Signal Div., Westinghouse Air Brake Co., Swissvale, Pa.
Eng. data & spare parts—20 ea—$10,743,534
United Motors Service Div., General Motors Corp., Detroit, Mich.
Spare parts—various—$37,141
Spare parts—various—$238,805
United Parts Company, Inc., Kansas City, Missouri
Vehicle parts—13,000 ea—$214,500
U. S. Gauge Div., American Machine & Metals, Sellersville, Pa.
Transmitter—356 ea—$43,992
U. S. Rubber Co., Mishawaka, Indiana
Carrying cases—3,000 ea—$69,250
United States Steel Co., Washington 6, D. C.
Armor plate—350 pcs—over $250,000
Armor plate—410 pcs—over $250,000
Utica Drop Forge & Tool Corporation, Utica, New York
Wrenches—107,712—$83,651

—V—

Van Norman Co., Springfield, Mass.
Milling machines—13 ea—$172,463

(*Turn to page* 152, *please*)

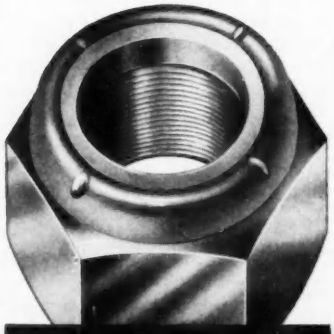
. . or Released in an Instant

Faster assembly . . . no more failures of fasteners. GREER STOP NUTS hold firm against jolts, shocks, shimmy, wobbles . . . any vibration, any kind.

Bolt threads are gripped tightly . . . these famous nuts *never* work loose. Yet an ordinary hand wrench gives instant release. The tough, built-in GREERCOID collar does it . . . and seals against fluid leakage, too!

Study *your* fastener problem. Over 3000 types and sizes. Consult GREER. Proved on thousands of products. Meets gov't and military specifications.

Write
GREER STOP NUT CO.
2620 Fleurnoy, Chicago 12, Ill.



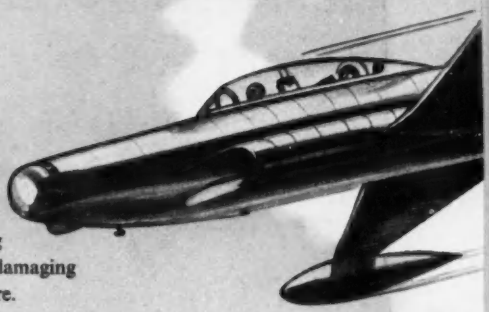
GREER
Stop Nuts

"on the beam" packaging

for SPERRY AIRCRAFT INSTRUMENTS

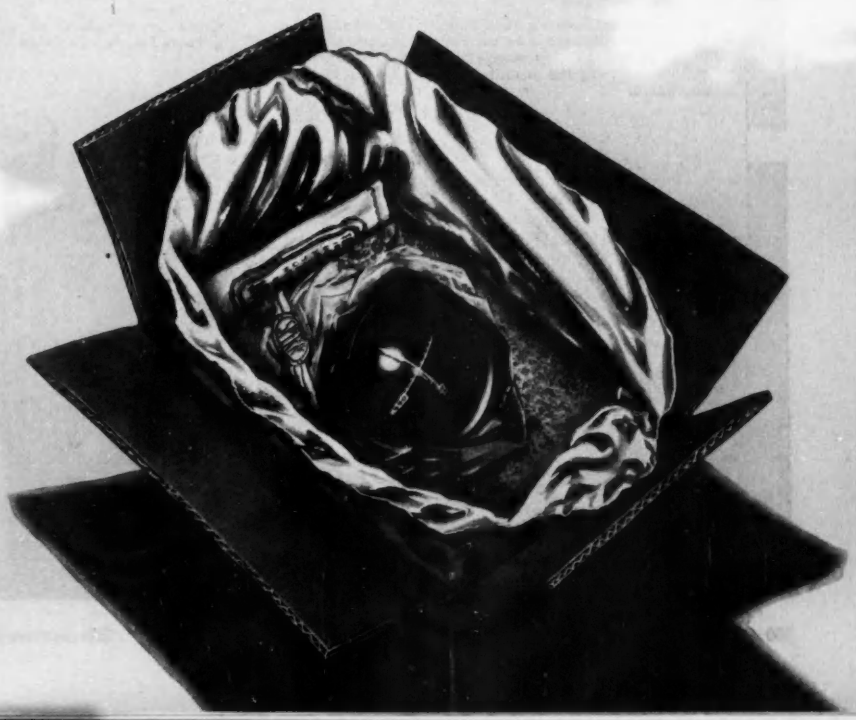
in SPARKLING Alcoa Aluminum Foil

Safer, all-weather flying . . . that's the big news behind Sperry Gyroscope Company's aircraft instruments. Used by both military and commercial aircraft, Sperry instruments help pilots fly the correct flight path . . . keep them "on the beam."



Often shipped to far-off places for installation, sensitive instruments must be packaged to assure accuracy on arrival. Alcoa Aluminum Foil helps Sperry meet this requirement. Used as the liner for a specially constructed bag, sparkling Alcoa Foil forms a barrier against penetration by such damaging corrosive elements as extreme heat, cold, dirt, moisture.

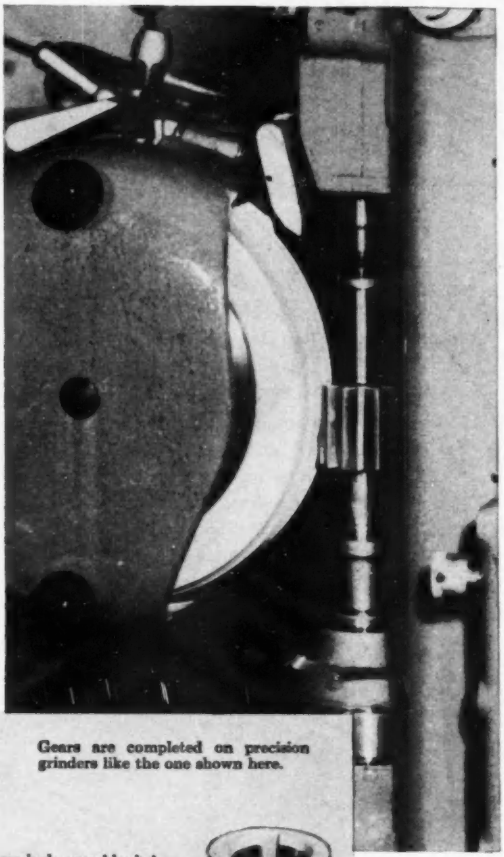
Alcoa and its converters—the nation's leading packaging firms—are continually developing new ways to package products better . . . in foil and foil laminates. For full information on advantages and applications just call your local Alcoa sales office, or write: ALUMINUM COMPANY OF AMERICA, 1764-H Gulf Building, Pittsburgh 19, Pennsylvania.



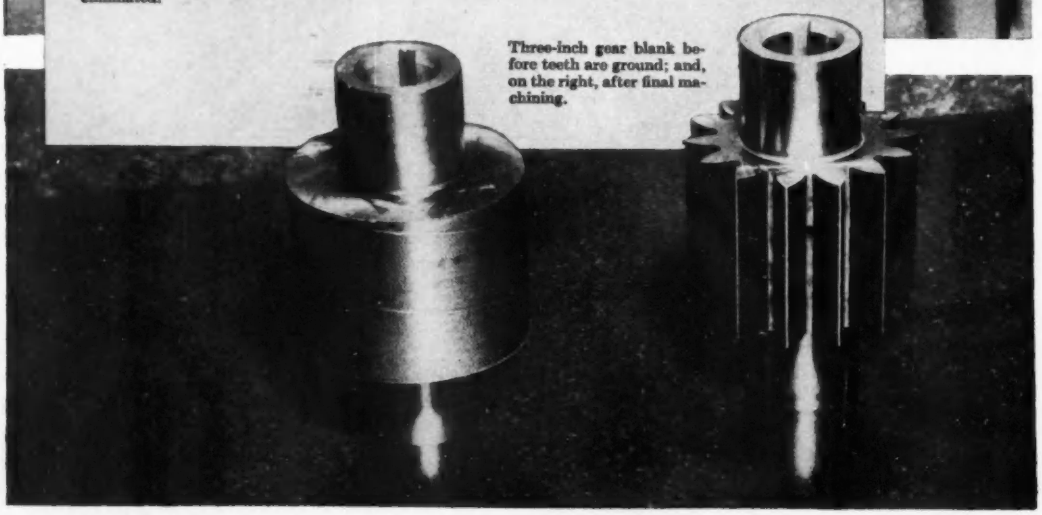
ALCOA

"Lean Carilloy

At Commercial Shearing and Stamping Company, gears are machined directly from bar stock. Since the change from rich to lean alloy steel, the need for normalizing and straightening the metal before machining has been eliminated.



Gears are completed on precision grinders like the one shown here.



Three-inch gear blank before teeth are ground; and, on the right, after final machining.

alloy steel is saving us $40 a ton ...with no loss in performance."

—T. C. Kane, Chief Engineer

Commercial Shearing and Stamping Co.

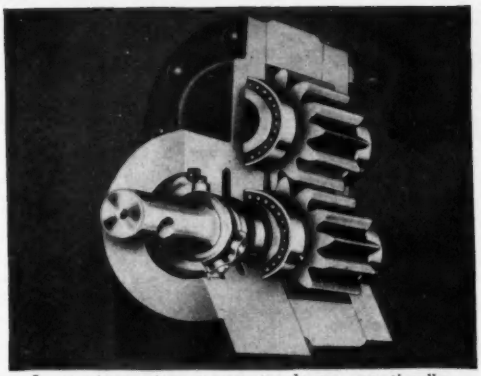
LIKE MANY other manufacturers who, today, cannot get rich alloy steel, Commercial Shearing and Stamping Company of Youngstown, Ohio, has found that many parts that must operate in extremely tough service can be made of *lean* alloy steels with no loss in performance.

Commercial Shearing makes a wide variety of steel products, including stampings and forgings; but it is in their gear-type rotary hydraulic pumps that they must do without rich alloy steel. Choosing a satisfactory alternate steel for the precision gears in these pumps presented quite a problem.

Mr. T. C. Kane, Chief Engineer at Commercial, tells the story this way: "We used to make the gears for our heavy-duty hydraulic pumps out of Carilloy 4615 (a Ni-Mo steel, with 1.65-2.00% nickel). But when nickel started getting scarce, we had to find a steel in better supply that would stand up in this severe service.

"Our gear-type rotary pumps are used in heavy-duty hydraulically-operated mobile equipment and must deliver a constant supply of oil at the correct pressure. In these pumps, oil is trapped between the teeth of two meshing gears and forced through the pump as the gears rotate. To obtain the high efficiencies necessary, gear dimensions must be held within extremely close tolerances. And wear must be held down, because a loss of just 0.005 inch causes a substantial drop in pump efficiency. These pumps operate at pressures as high as 1500 psi and speeds up to 2000 rpm; so we have to be sure to use a tough, wear-resistant steel for the gears. The question was, how to get this in a lean alloy steel.

"One of United States Steel's service metallurgists helped us out. After analyzing our requirements, he suggested a straight-chrome alloy steel—Carilloy 5120. Now that we have lived with this steel for a while, we are frankly surprised at the excellent results we are getting. Not only are our pumps as good as ever, but this straight-chrome steel has important advantages for us over the richer alloy:



In gear-type rotary pumps, speeds are exceptionally high—up to 2000 rpm; and pumps operate at pressures as high as 1500 psi. At Commercial Shearing and Stamping Company, gears for this severe service are now made of straight-chrome instead of nickel-molybdenum steel.

"First of all, Carilloy 5120 is easier to machine, so naturally our tools last longer.

"Our heat treating problems are easier, too. Carilloy 4615 had to be normalized and straightened before machining. This is no longer necessary since there is less distortion in carburizing operation.

"With reduced heat-treating costs and a lower grade extra, the change to lean alloy steel is saving us $40 on each ton of steel we buy."

★ ★ ★

The switch from rich to lean alloys is not always as easy as it was at Commercial Shearing and Stamping Company. You may require special heat treating, or simply more *careful* heat treating, to obtain desired mechanical properties. But whatever your steel problems, our metallurgists will be glad to help you with them. Just call the nearest District Sales Office or write to United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

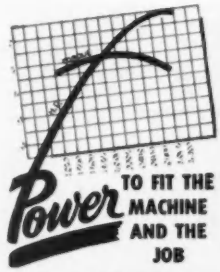
U·S·S Carilloy Steels

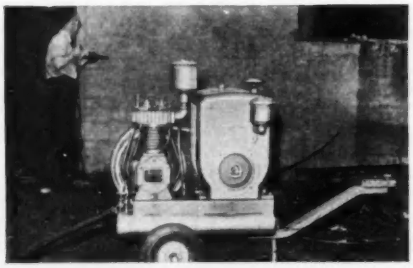
USS

UNITED STATES STEEL COMPANY, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

2-1250

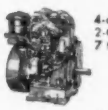
UNITED STATES STEEL





WISCONSIN-POWERED
Gardner-Denver Compressor

4-cycle
Single Cyl.
3 to 9 hp.


4-cycle
2-Cyl.
7 to 13 hp.

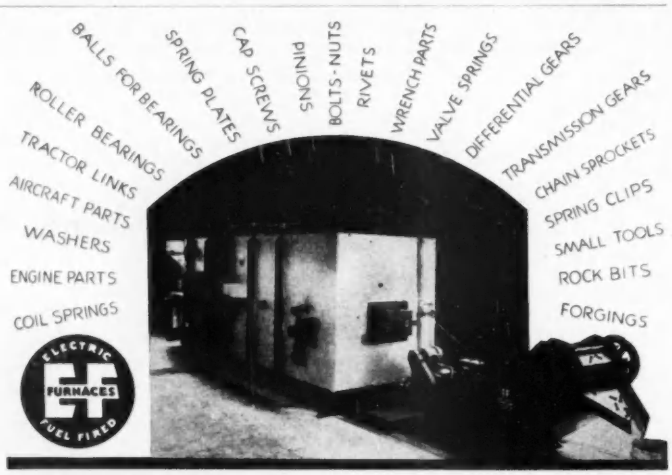
V-type
4-Cyl.
15 to 30 hp.

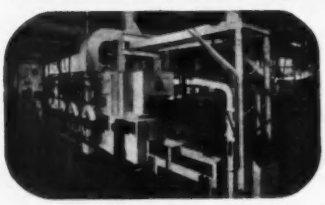
This Model TP0493LE Portable Compressor, made by Gardner-Denver Co., Quincy, Ill., is supplying air for the operation of a Model 87 Utility Drill, engaged in a plant maintenance job. Complete power reliance is placed on the Model TF 2-cylinder Wisconsin Heavy-Duty Air-Cooled Engine.

More and more builders of engine-driven equipment are discovering, to the satisfaction of themselves and their customers, that you can't do better than to specify "Wisconsin Engines"... for dependable power to fit both the machine and the job.

Available in a complete power range from 3 to 30 hp., in 4-cycle single cylinder, 2-cylinder and V-type 4-cylinder models, Wisconsin Air-Cooled Engines provide economical power, without waste, to meet the most exacting requirements. Look into them for your use.

WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 46, WISCONSIN





EF Chain Belt Conveyor Furnace, Radiant Tube Gas Heated. Showing Labor Saving Loading Arrangement. (In the view at the top) Electrically Heated Furnace Showing Automatic Quench and Discharge.

For Hardening Small Parts
Uniformly—Scale Free—Continuously
175 to 2000 Lbs. per Hr.

The EF chain belt conveyor furnace is one of the most satisfactory continuous heating units yet devised for scale-free hardening, carbon restoration and non-decarb heat treating small and medium size parts. 11 standard sizes. Capacities to 2000 lbs. or more per hour. Gas, oil or electrically heated. Furnished complete with any desired feeding or discharging equipment. Write for folders describing our chain belt or other production furnaces.

THE ELECTRIC FURNACE CO.
WILSON STREET, SALEM, OHIO
Gas Fired, Oil Fired and Electric Furnaces

(*Continued from page* 148)

Versa-Mil Company, New York, N. Y.
Milling attachments—13—$19,302
George E. Viereck & Co., Washington, D. C.
Milling machine—20—$80,428
Milling machine—8—$77,740

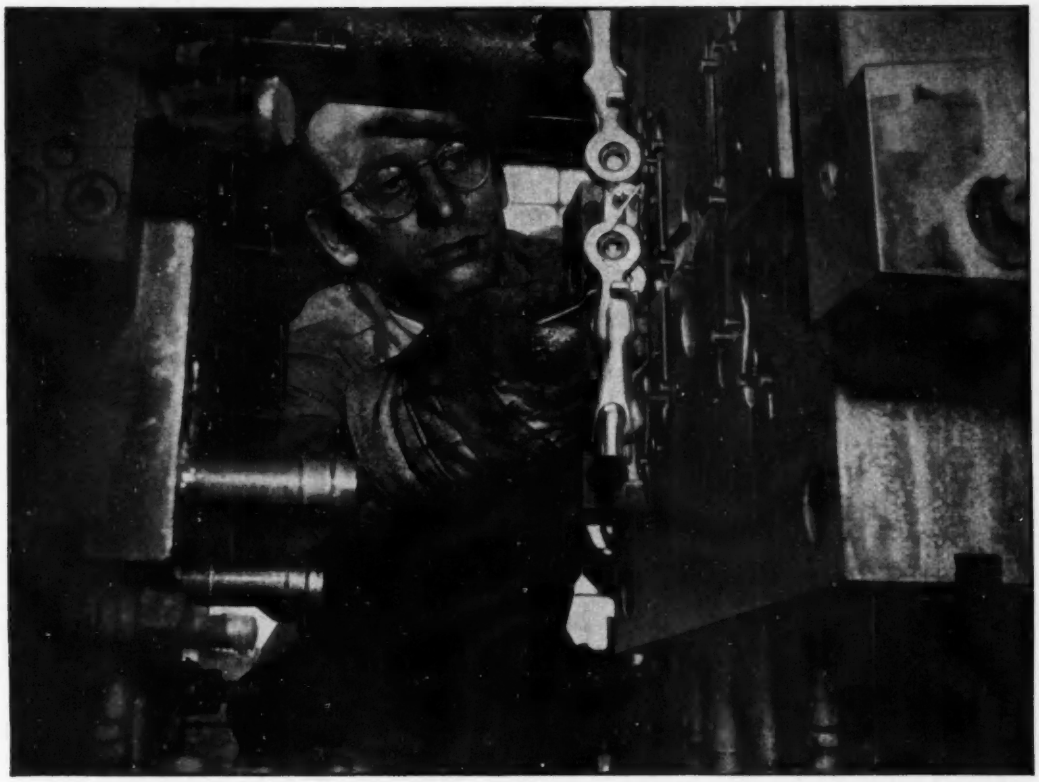
—W—

The Waco Aircraft Co., Troy, Ohio
Modification kits—491 ea—$32,396
Ward LaFrance Truck Corp., Elmira, N. Y.
Vehicle parts—860 ea—$60,269
Ward Machine Company, Inc., Brockton, Mass.
Fuze—696,750—$1,114,800
Warner Automotive Division, Borg-Warner Corporation, Auburn, Indiana
Spare parts—var—$39,980
Warner Fruehauf Trailer Co., Baltimore 30, Md.
Trailers—4 ea—$60,909
The Warner & Swasey Co., Cleveland, Ohio
Lathe—10—$303,707
The Watson-Stillman Co., Roselle, New Jersey
Moulding press—2—$26,912
Waukesha Motor Co., Waukesha, Wisc.
Engine assy.—$28,681
Wayne Mfg. Company, Pomona, Calif.
Repair parts—370 line itm—$92,762
Western Electric Co., Inc., New York, N. Y.
Modification kits—$25,611
Westinghouse Electric Corp., Charleston, S. C.
Generator—1—$74,555
Westinghouse Electric Corp., New York 21, N. Y.
X-Ray apparatus—447—$532,824
Whiting Corporation, Harvey, Illinois
Repair parts—67 line itm—$28,243
Wilton Tool Mfg. Co., Chicago, Illinois
Vises—1500—$26,688
Wright Aeronautical Div., Curtiss-Wright Corp., Wood-Ridge, N. J.
Special tools—$27,793
Wyandotte Chemical Corp., Wyandotte, Mich.
Cleaning compound — 1,500,000 lbs — $76,875
Wycoff Steel Company, Chicago, Illinois
Hardware—305,642 ea—$25,334

—Y—

Yale & Towne Mfg. Co., Phila. Div., Philadelphia, Pa.
Trucks—210—$1,638,630
Trucks—$67,988

AUTOMOTIVE INDUSTRIES . . .
is your News Magazine of Automotive and Aviation
MANUFACTURING



You Can See The Difference

ALUMICAST die casting quality assured because of expert scientific control

Here at **ALUMICAST**, we are equipped with the most modern laboratory and production equipment to turn out high quality die castings as well as permanent mold and semi-permanent mold castings of aluminum or magnesium. Castings that are flawless because every step, from ingot to finished casting, is rigidly supervised and is your assurance of expert scientific control second to none. This value, we call "E.S.C.", is vital to your business because it helps make good products better.

If you have a design problem or a production problem in which you believe a die casting or permanent mold casting might be the solution, let our nationally recognized authorities in research, metallurgy, engineering and production give you a helping hand. They will be more than happy to receive and analyze your blueprints and suggest an answer to your problem. No obligation, of course.

No matter where you are located, you will find **ALUMICAST** a quick and reliable source for quality castings. You are cordially invited to consult us relative to your civilian or defense needs. We have sales engineers and representatives in leading cities. If you don't know the name of the one nearest you, write direct to us.

ALUMICAST CORPORATION, 1521 N. Kilpatrick Avenue, Chicago 51, Illinois

ALUMICAST

ALUMINUM and MAGNESIUM PERMANENT MOLD and DIE CASTINGS

"E.S.C." EXPERT SCIENTIFIC CONTROL

WILL KEEP YOUR ASSEMBLY LINES AT PEAK CAPACITY

Whatever you manufacture or assemble, you can speed production and improve your product by using Pheoll screws, bolts and nuts. These industrial fasteners drive easy and straight, and will not bind because threads are accurately rolled or machined. Precision-made screw and bolt heads, slots and head recesses prevent wrench and driver slippage. Count, too, the added bonus you receive by using fasteners that improve product appearance.

An interesting story on standard and special industrial fasteners and their profitable applications to your needs may be obtained from experienced Pheoll engineers. Ask these men to recommend screws, bolts and nuts that will increase your overall profits on assembly line work.

these Pheoll products prevent production lag

Tapping Screws • Cap Screws • Sems • Phillips Recessed Head Screws and Bolts • Machine Screws • Special Fasteners • Thread Cutting Screws

Pheoll MANUFACTURING COMPANY
5700 ROOSEVELT ROAD
CHICAGO 50, ILLINOIS

SCREWS • BOLTS • NUTS
Industrial Fasteners and Holding Devices

Flash Welding Titanium

(*Continued from page* 39)

Cross sections up to two sq in. have been welded, and there appears to be no reason that several times this area cannot be welded.

The introduction of the higher strength alloys such as RC-130B and TI-150A presented a problem not normally encountered in working with other ferrous and non-ferrous materials. This was the apparent sensitivity of these materials to cracking in areas of surface or structural discontinuities. It was found that on bars which had surface defects removed by grinding just prior to shipment from the mill, cracking occurred when the bars were clamped in the welding machine. One lot, which had been checked for hardness at the mill, fractured through the Brinell impressions. If fracture did not occur at these points immediately upon clamping, it was noted that cracks appeared sometime after the weld was completed. The additional stresses set up by the thermal gradient during the welding cycle apparently are sufficient to cause failure. When bars were annealed at the mill after surface preparation, no trouble was encountered. In processing at American Welding and Mfg. Co., it was found that a rough chip or grind mark resulting from burr removal could give rise to cracks, but cracking could be avoided by getting the rings into a furnace at 1300 F immediately after welding.

A typical weld cycle for 2x5/16 in. bars of RC-130B flash welded into a ring consumed eight seconds with the voltage (open circuit) at 6.2. Flashing travel was ¾ in., upset travel ⅝ in. and final die opening ⅛ in. That cycle produced welds of 152,000 TS, 146,500 yield, and 15 per cent elongation in two in. with a reduction in area of 46 per cent.

Occasionally welds of good strength exhibited very low ductility—elongations of one-seven per cent. Investigations in the customer's laboratory, as well as in our own, showed this to be associated with a banded structural condition in the bars. Additional welds made in the same banded bar always showed low values. A similar condition is encountered on heavily banded dirty steels that are flash welded. The upset portion of the welding cycle turns the fibers at the weld outward so they lie transverse to the bar axis and the inclusions present in the material act as

At
Hotel Cleveland
you'll enjoy
friendly, attentive service...
delicious food...
quiet, sleep-inviting rooms...
a sincere and hearty welcome.

★

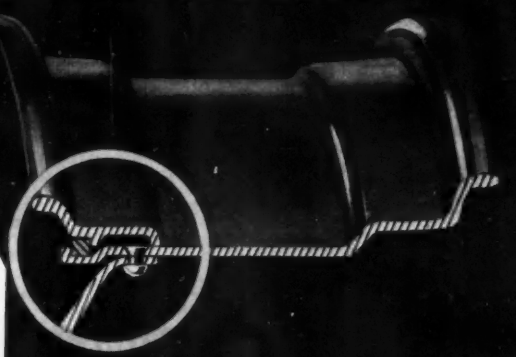
You'll be only a step
(through covered passage)
to Union Terminal trains
and garage, and convenient
to anywhere you'll want
to go in Cleveland.

Hotel Cleveland
CLEVELAND, OHIO
Other Affiliated Sonnabend Hotels
NEW YORK — Ritz Tower
CHICAGO — Edgewater Beach Hotel
BOSTON — The Somerset, The Puritan, The Shelton
RESORTS — Whitehall, Palm Beach, Fla. Somerset, Rockland, Me.

KELSEY-HAYES

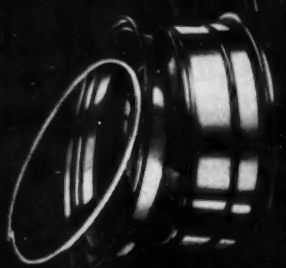
Advanced Design

3 pc. Truck Wheel



With the
EXCLUSIVE K H
Safe LOCKING DEVICE

Hailed by truck manufacturers and tire servicing men as the safest ever devised! As tire is inflated the retaining ring locks the assembly even tighter. Also assures greatest convenience in tire mounting, demounting, and tube insertion!



Available in all popular sizes for leading makes of trucks . . . to increase tire mileage 20% to 50%!

KELSEY-HAYES WHEEL COMPANY

DETROIT 32, MICHIGAN

PRODUCTS: Wheels—Hub and Drum Assemblies—Brakes—Vacuum Brake Power Units—for Passenger Cars, Trucks, Buses—Electric Brakes for House Trailers and Light Commercial Trailers—Wheels, Hubs, Axles, Parts for Farm Implements.
PLANTS: Kelsey-Hayes Plants in Michigan (4); McKeesport, Pa.; Los Angeles, Calif.; Davenport, Iowa; Windsor, Ontario, Canada.

ACE PLASTIC EXTRUSION
PLUS FABRICATION
• from Rods
• Sheets, Tubes
• Special Shapes
Extruded parts from the raw material to the finished product . . . on Ace specialty. Ace Plastic rods, tubes and shapes are custom extruded and machined automatically to your most exacting specifications. Let our engineers assist you with your plans.
WRITE TODAY FOR SAMPLES; send prints for quotations.
By the manufacturers of famous Ace Nylon Balls
ACE PLASTIC COMPANY
Precision Plastic Fabricators and Extruders
91-46 Van Wyck Blvd. • Jamaica 2, N. Y.

A·S·R asked
Where to get a small handle button, wear-and-water-resistant . . . light enough to be set in plastic . . . produced in large quantities, quickly and inexpensively?
GRC* answered
ACTUAL SIZE
Tiny GRC precision zinc die castings will make ideal handle buttons for the new Gem razor . . . meet to a T every ASR specification!
ASR's GEM
American Safety Razor's new Feather Weight Gem Razor weighing only 1 1/10 oz.
*WITH GRC TINY PRECISION ZINC DIE CASTINGS
If obtaining really small parts speedily and economically is your problem, too, why not let GRC tackle it? Gries' revolutionary, high speed, mass production methods are geared to turn out simple or intricate parts in one operation. Trimmed, ready for use . . .GRC zinc die castings as small as .000004 of a lb. in lots from 100,000 to millions . . . at a price to help you produce at a profit! Remember . . . it's GRC for smallness unlimited.
Write Today for Bulletin and Actual Part Samples
GRIES REPRODUCER CORP.
120 Willow Ave., N. Y. • Phone: MOtt Haven 5-7400
MAX. WT. - 1/2 OZ.
MAX. LGTH. - 1 3/4"
SMALLNESS UNLIMITED

notches which produce brittle failure. In the titanium alloys, a banded structure without any apparent inclusions as such, is sufficient to produce failure. This condition is now well known to the alloy manufacturers and so should not be encountered in the future on flash welding applications.

Titanium alloys have been flash welded to aluminum alloys and to carbon steels. This work was carried on only as a curiosity, with no present practical applications in mind. On such joints, failure occurs outside the weld when tested in tension or bending.

In summary, flash welding of titanium alloys can be readily accomplished provided:

1. Material is of good quality and uniform structure.
2. Techniques similar to those used for aluminum are employed.
3. Welded parts are annealed or otherwise furnace treated immediately after welding.

The above is from a paper presented by the author at the Titanium Fabrication Conference Minerals and Metals Advisory Board, National Academy of Sciences, National Research Council, in Cleveland, Ohio.

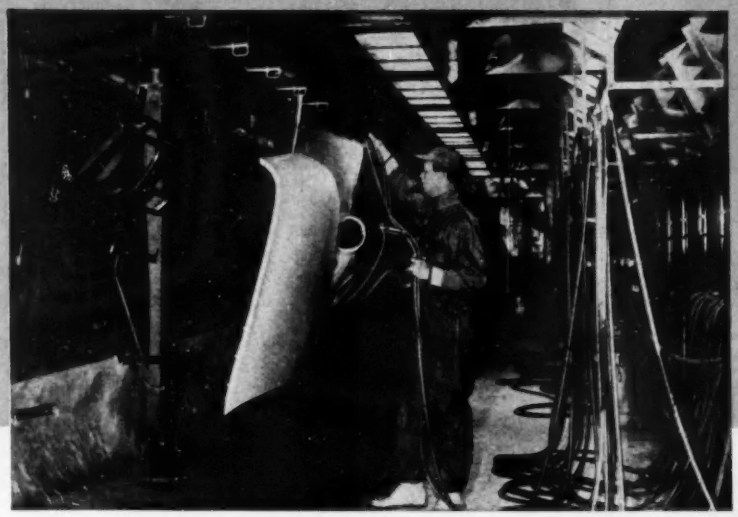
Iron and Steel Exports Show Gain Over Total for 1950

Iron and steel exports in 1951 increased nearly 400,000 tons or 14 per cent over 1950. However, except for 1950, the 3277 million tons shipped out of this country was a lower amount than in any other year since 1939, according to a recent report by American Iron and Steel Institute.

Canada remained the largest importer of iron and steel products from the U. S., receiving nearly 1.2 million tons, an increase of approximately 340,000 tons over 1950. Mexico was the second largest customer, taking 256,000 tons. Those North American countries, with Cuba and some Isthmian nations, took about half of the total iron and steel exports from the U. S., as compared with 43 per cent in 1950.

South America replaced Europe as the second largest consuming continent, receiving more than 588,000 tons in 1951 compared with less than 400,000 tons the previous year. Venezuela took 198,000 tons, and Brazil received 120,000 tons.

Exports of iron and steel products from the U. S. to Europe were 430,000 tons, 20 per cent less during 1951 than during 1950. Asia ranked fourth as a customer for American iron and steel exports, taking 407,000 tons in 1951.



A NEW FACE *for a* NEW JOB!

Did you ever hear of a spray painting booth where the men could work without wearing masks? And if YOU are directly responsible for the efficiency, safety and production of such a booth, did you ever think of the improvement that could be effected in general conditions if the men could work unhampered? Well, the illustration above shows spray painters at work in a PETERS-DALTON CONVEYORIZED booth in a leading West Coast auto plant. THEY ARE WORKING WITHOUT MASKS! The higher suction and greater washing action of PETERS-DALTON HYDRO-WHIRL SYSTEMS guarantee maximum efficiency with maximum safety. If any of your manufacturing problems concern PAINT SPRAY BOOTHS, METAL WASHING EQUIPMENT, DRYING and BAKING OVENS, DUST COLLECTING SYSTEMS, it will pay you to investigate PETERS-DALTON. We believe in safety, production and "good housekeeping"—and incorporate these three important qualities into our equipment.

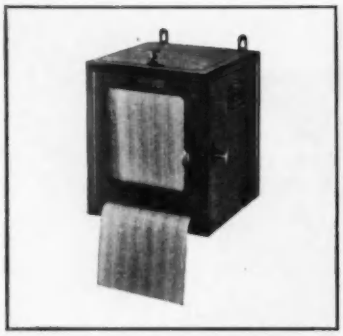
For Paint Spray Booths • Metal Washing Equipment • Drying and Baking Ovens • Dust Collecting Systems. Inquire Today.

HYDRO-WHIRL

For Finer Finishing Equipment—In Any Industry—It's

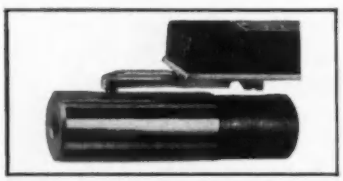
PETERS-DALTON *Inc.*

17930 RYAN ROAD • DETROIT 12, MICHIGAN



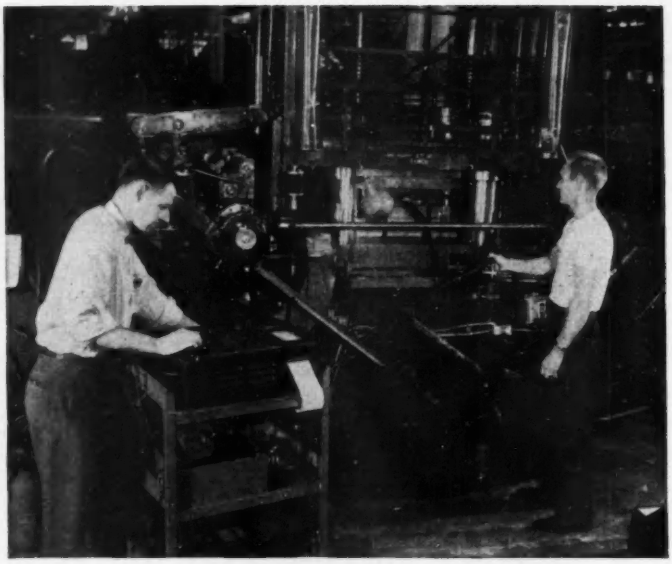
RECORDS SIX VARIABLES SIMULTANEOUSLY. The Brush six-channel Magnetic Oscillograph is designed for simultaneous recording of six electrical and/or mechanical phenomena, with a chart record instantaneously available. This instrument facilitates multiple strain measurement, vibration analysis, wind tunnel work, circuit analysis, etc. Built-in gear changer provides instantaneous shift from high to low speed; wide choice of chart speeds available.

RECORDS SIX VARIABLES CONSECUTIVELY. If simultaneous strain measurements are not necessary, consecutive measurements can be made with substantial saving in equipment cost. The Universal Bridge Switch, when coupled with a Brush Universal Analyzer and two-channel Magnetic Oscillograph, permits consecutive recording of strain measurements from six different locations on the structure or specimen being tested. One of the two channels of the oscillograph records strain, the other channel indicates the location of the particular strain measurement.



CHARTS SURFACE PROFILE. As this Brush Pickup probes the surface on the cylindrical piece, a chart is drawn by a Brush Surface Analyzer . . . giving positive, numerical recording of the surface profile. Surface irregularities of less than 1 micro-inch can be measured accurately. Brush Surface Analyzers eliminate guesswork in specifying and checking finishes on various surfaces: metal, plastic, glass, paper, etc. In addition to chart recording, *average finish* is indicated on a large illuminated scale.

For catalog describing these Brush instruments, write The Brush Development Company, Dept. EE-34, 3405 Perkins Avenue, Cleveland 14, Ohio.



QUICK LOAD MEASUREMENTS PREVENT PRESS BREAKDOWNS

● Easy testing of operating parts and structures with Brush Strain Analyzers simplifies preventive maintenance.

Here, in the plant of a large manufacturer of automotive parts, periodic checks are made on this 150-ton mechanical press to spot possible overloading. With resistance-type strain gages mounted on the press, the signal is amplified and recorded by the Brush Strain Analyzer . . . producing an *immediate chart record* of press strain.

Since measurements can be made quickly and easily, the Brush Strain Analyzer furnishes a *practical method* of preventing overloading and costly breakdowns, and lengthening press life.

You can use Brush Recording Analyzers to save time and solve problems . . . in measurement of strain, torque, vibration, pressure, d-c or a-c voltages or currents, and other variables. Brush representatives are located throughout the United States. In Canada: A. C. Wickman, Limited, Toronto.

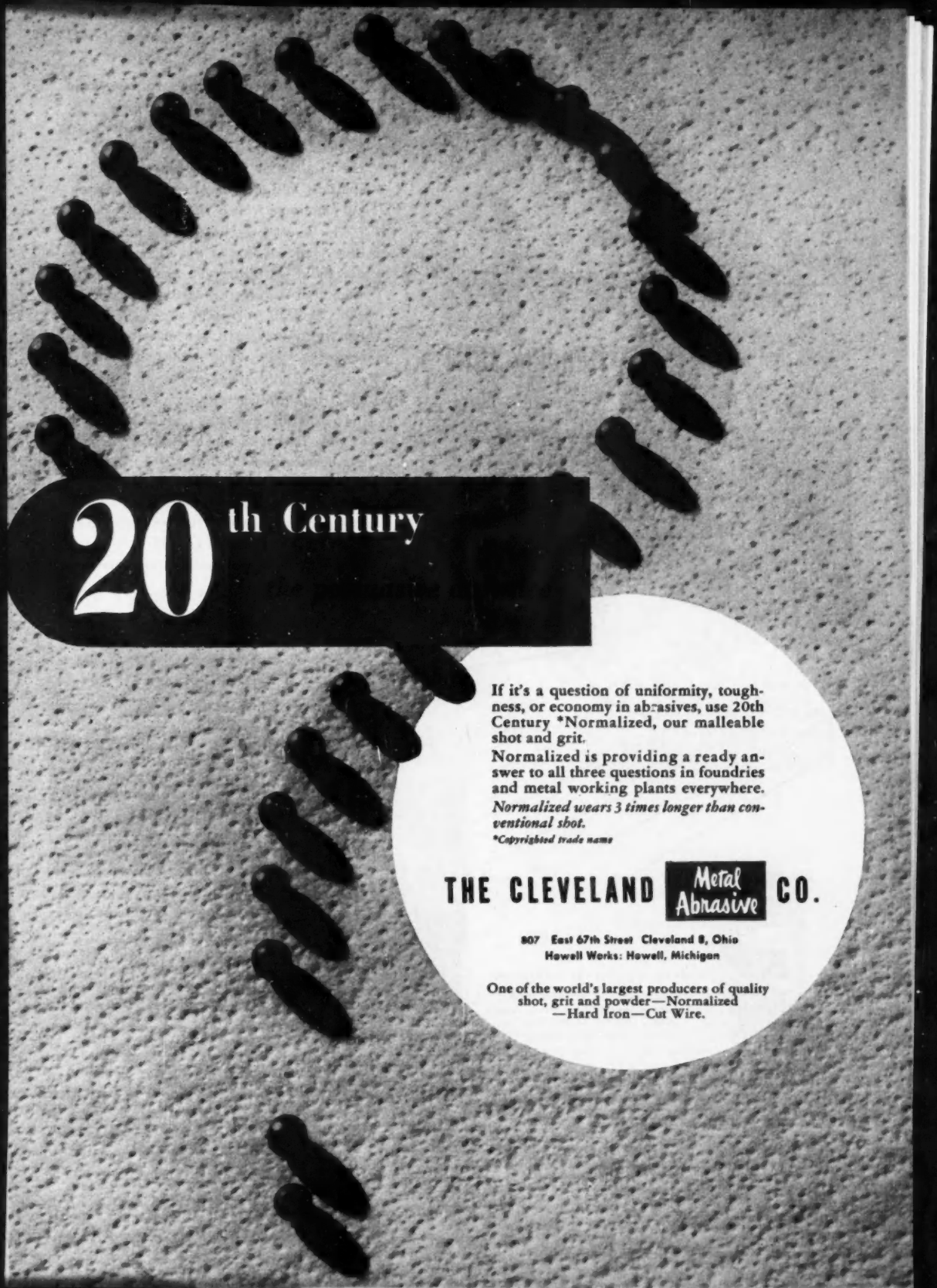
For catalog write The Brush Development Company, Dept. DD-34, 3405 Perkins Avenue, Cleveland 14, Ohio.

PUT IT IN WRITING WITH A BRUSH RECORDING ANALYZER...

THE Brush DEVELOPMENT COMPANY

BRUSH

Piezoelectric Crystals and Ceramics
Magnetic Recording Equipment
Acoustic Devices
Ultrasonics
Industrial & Research Instruments


20th Century
If it's a question of uniformity, toughness, or economy in abrasives, use 20th Century *Normalized, our malleable shot and grit.
Normalized is providing a ready answer to all three questions in foundries and metal working plants everywhere.
Normalized wears 3 times longer than conventional shot.
*Copyrighted trade name
THE CLEVELAND Metal Abrasive CO.
807 East 67th Street Cleveland 8, Ohio
Howell Works: Howell, Michigan
One of the world's largest producers of quality shot, grit and powder—Normalized —Hard Iron—Cut Wire.

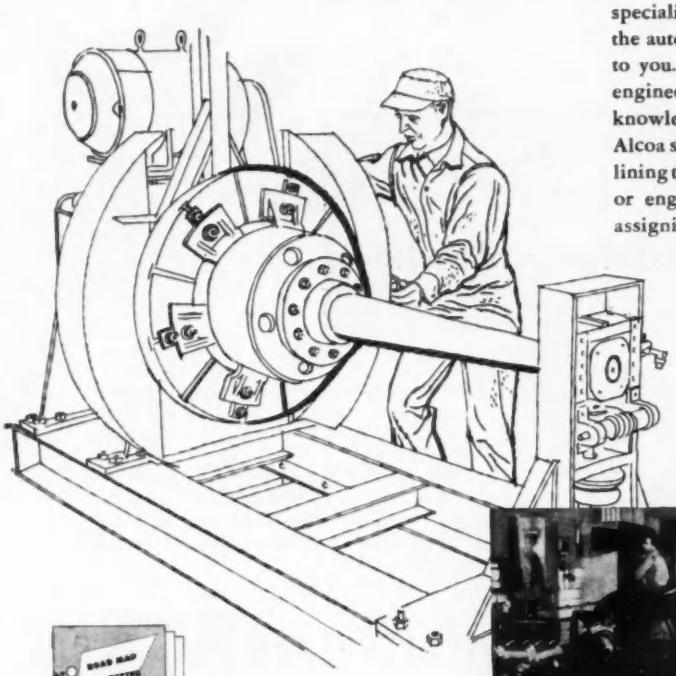
"GOING LIKE SIXTY"

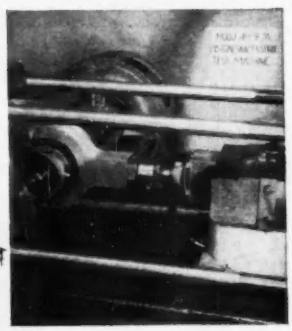
. . . standing still!

Road-run loads—even the torturous strain of rounding a curve at 60 mph—are simulated right in the middle of Alcoa's busy Research and Development Laboratories on a unique wheel tester specially designed by Alcoa engineers to put aluminum wheels through their paces.

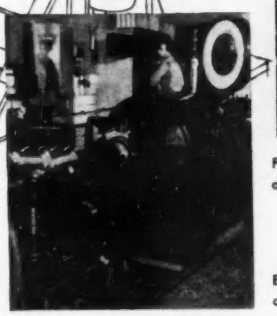
The wheel tester and other equipment illustrated are part of the Alcoa facilities devoted to advancing the application of aluminum's advantages in the automotive field. They allow Alcoa's engineers to test thoroughly each new development under laboratory-controlled conditions.

These facilities, and the services of specialists familiar with the problems of the automotive industries, are available to you. To get in touch with the Alcoa engineering personnel who have specific knowledge of your field, call your local Alcoa sales office. Or write directly to us, outlining the project you have in mind. Sketches or engineering drawings will help in assigning the proper specialists to your job.

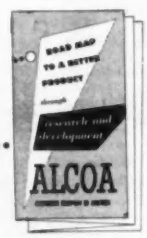




Fatigue-testing machine, built by Alcoa, for applying fatigue loads to the skirt of a piston.



Electric dynamometer for testing internal combustion engines.



"Road Map To A Better Product" outlines Alcoa's Research and Development facilities. Send for your copy by mailing this coupon, today.

ALUMINUM COMPANY OF AMERICA
1841-H Gulf Bldg., Pittsburgh 19, Pa.

Name_____

Company_____

Address_____

City_____ State_____

ALCOA

First in Aluminum

ALCOA TELEVISION—CBS Network, 6:30 to 7:00 P. M. EDST every Sunday on most stations—8:30 to 9:00 P. M. in far West

What Do You Want Most in Tube Fittings?

NO LEAKS

ability to withstand VIBRATION

FASTER assembly

Get Them ALL in

IMPERIAL Hi-Duty® FITTINGS

The Tube Coupling that will not leak even under vibration

Imperial Hi-Duty Fittings withstand over 5 times as much vibration as ordinary Compression or Flared brass fittings. Design of sleeve minimizes deformation of tubing in assembly—tubing is kept stronger at points of greatest stress. Trouble-proof performance proved by widespread use in severe applications.

SLEEVE SHEARS OFF AT GROOVE

★ For Tubing ⅛" to ¾" O.D.

★ Available in Brass or Aluminum

★ Ask for Bulletin No. 3002

Easier and Quicker to Assemble

Fitting comes with nut assembled. To get a tight joint, simply insert tube into fitting and tighten nut. No loose sleeve to drop . . . no flaring required. Makes repeated tight reconnections.

With IMPERIAL you can be sure of the finest in fittings . . . fittings that have *forged* bodies on elbows and tees providing greater strength and toughness . . . *long* Dryseal pipe threads for extra assurance of tight pipe connections. See Catalog 350.

THE IMPERIAL BRASS MANUFACTURING COMPANY

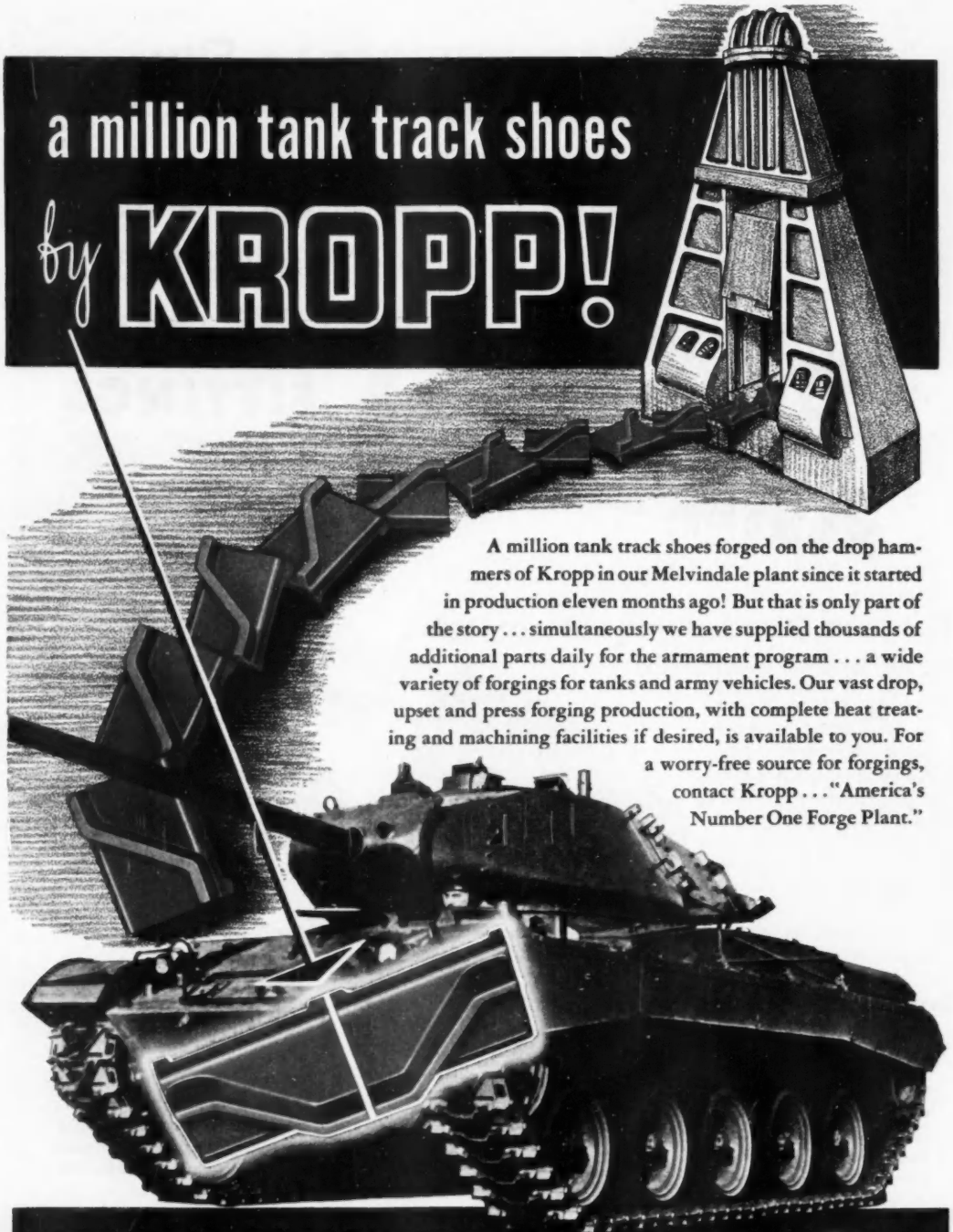
1241 W. Harrison St., Chicago 7, Illinois

In Canada: 334 Leader Ave., Toronto, Ontario

IMPERIAL

Pioneers in Tube Fittings and Tube Working Tools

a million tank track shoes *by* KROPP!



A million tank track shoes forged on the drop hammers of Kropp in our Melvindale plant since it started in production eleven months ago! But that is only part of the story . . . simultaneously we have supplied thousands of additional parts daily for the armament program . . . a wide variety of forgings for tanks and army vehicles. Our vast drop, upset and press forging production, with complete heat treating and machining facilities if desired, is available to you. For a worry-free source for forgings, contact Kropp . . . "America's Number One Forge Plant."

KROPP FORGE ORDNANCE COMPANY

MELVINDALE . . . MICHIGAN

Subsidiary of Kropp Forge Company

The trend is to more forgings with BLISS *Presses*

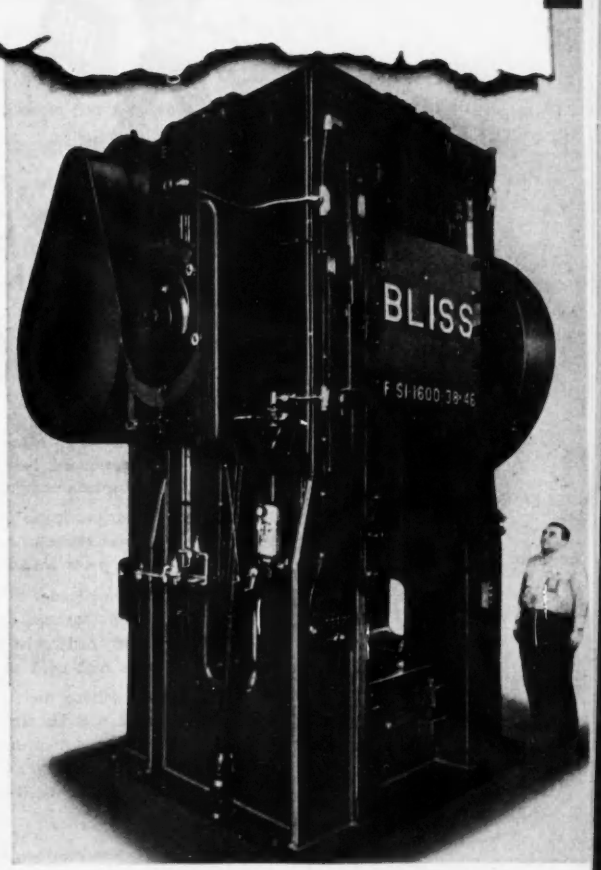
Here are the "Plus" Features of the New Bliss Forging Press:

Easily adjusted die seat: The wedge-type die seat permits easy, positive adjustment.

Withstands severe usage: A specially-designed Bliss heavy-duty air friction clutch and an air release spring brake, both mounted on a full eccentric main shaft, permit fast press speeds on 'round-the-clock production runs.

Die alignment maintained even when off-center loads are applied, because front of slide has long, continuous gib ways extending up into crown.

For complete information on the new Bliss line of High-Speed Forging Presses, write for Catalog 42.



New Bliss Forging Press for high production to be built in a wide range of sizes with capacities up to 4,000 tons.

BLISS

ON YOUR PRESS IS MORE THAN A NAME...IT'S A GUARANTEE!

E. W. BLISS COMPANY, CANTON, OHIO
E. W. Bliss (England) Ltd., Derby, England
E. W. Bliss Company (Paris), St. Ouen sur Seine, France

PRESSES, ROLLING MILLS, SPECIAL MACHINERY

Branch Offices in Chicago, Cleveland, Dayton, Detroit, Indianapolis, New Haven, New York, Philadelphia, Rochester, Toledo, and Toronto, Canada. West Coast Representatives: Moore Machinery Co., Los Angeles and San Francisco; Star Machinery Company, Seattle. Other dealers in United States and cities throughout the world.

The Parker representative who calls on you is backed by 37 years of experience.

You can't buy as much experience in protective coatings for metals anywhere!

IT'S FREE

to Parker customers

There's no place else to go! Not if you want the most experienced, best informed, most dependable advice on phosphate coatings for metal. *Call on Parker!*

Your particular problem may be cold forming of metals, a rust resistant base for paint, maximum corrosion resistance, or a wear resistant for friction surfaces.

Parker, leader in its field since 1915, has the products and the background of experience to start you right, guide you away from costly mistakes and delays, and keep your production at a high peak of efficiency and quality.

By solving the surface treatment problems in thousands of plants, each with its slightly varied conditions, Parker Rust Proof has built a store of *know-how* that is unique. Why should you learn the hard way? Call in Parker, use a dependable Parker product, and take advantage of what we've learned in 37 years about treating metal surfaces.

**Bonderite, Bonderlube, Parco, Parco Lubrite—Reg. U. S. Pat. Off.*

PARKER *rust proof company*

2178 E. MILWAUKEE • DETROIT 11, MICHIGAN

BONDERITE
corrosion resistant paint base

PARCO COMPOUND
rust resistant

Since 1915 1*st* *in the field*

BONDERITE and BONDERLUBE
aids in cold forming of metals

PARCO LUBRITE
wear resistant for friction surfaces

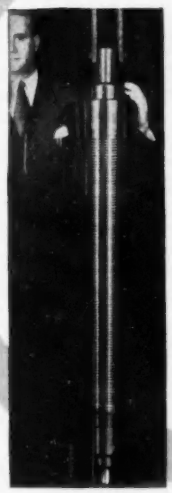
The Parker Technical Representative never says goodbye. He's back periodically to be sure your installation is operating efficiently and economically.

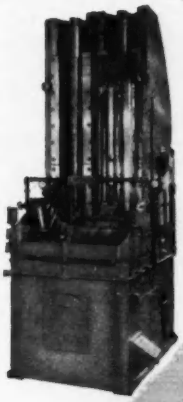
IN LAPOINTE BROACHING

50 YEARS IN BROACHING! We're the oldest in the world!
1902 • GOLDEN ANNIVERSARY • 1952

You don't need to advertise for more skilled operators to meet extraordinary production schedules . . . when you're equipped with Lapointe Broaching Machines and Broaches.

That is why, with the baffling shortages of skilled workers, many production men are taking time out in the midst of emergency programs to investigate Lapointe broaching, for insurance against future man-power shortages. Through broaching you are assured of repetitive accuracy, together with remarkable production speed.



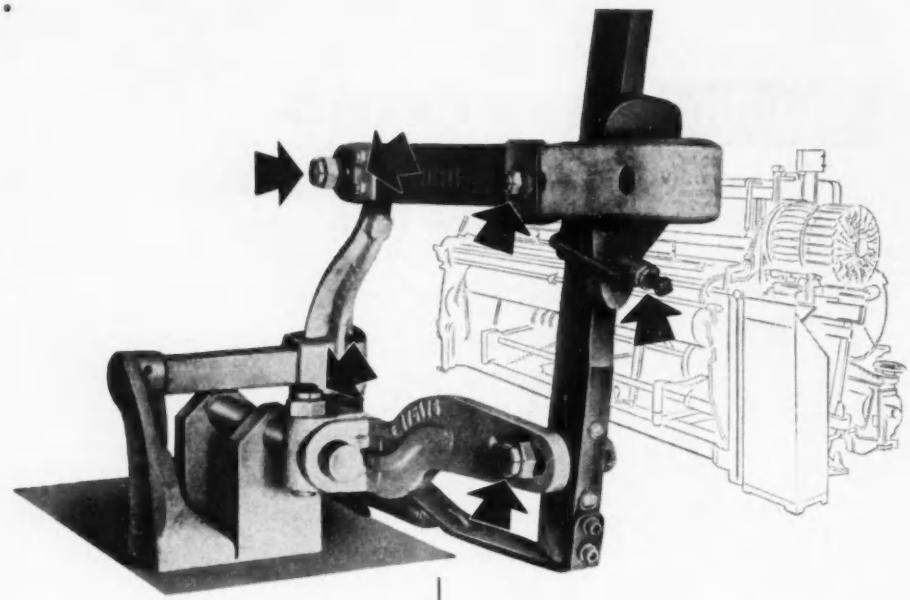


LAPOINTE
Broaching Machines
operate with push-button controls, and have safety devices that eliminate all possibility of incorrect operation or of harm to the operator. Then, too, with all of the accuracy actually engineered into the broach itself, the usual problem of rejects and re-work is eliminated.

Full information is available in our illustrated circular on Lapointe Double Ram Vertical Broaching Machines. Write for Bulletin DRV-10

THE LAPOINTE MACHINE TOOL COMPANY
HUDSON, MASSACHUSETTS • U. S. A.
Branch Factory: Watford, Herts., England

THE WORLD'S OLDEST AND LARGEST MANUFACTURERS OF BROACHING MACHINES AND BROACHES



POSITIVE LOCKING

...a must on this Textile Machinery application

Even the impact vibration of picker stick and shuttle operation on high speed looms won't loosen FLEXLOC Self-Locking Nuts. Yet FLEXLOC Locknuts can be easily removed and replaced repeatedly without losing their positive locking ability.

FLEXLOC Self-Locking Nuts feature one-piece, all-metal construction—no parts to work loose; resilient, automatic locking sections—processed to permit control of torque within narrow limits; temperatures up to 550°F. won't affect them. Write for descriptive literature. Although the Government is taking almost all of our output, we'll be glad to supply samples for test run on your equipment. Just let us know the size you need. STANDARD PRESSED STEEL Co., Jenkintown 53, Pennsylvania.

FLEXLOC Self-Locking Nut, "thin" type
FLEXLOC Self-Locking Nut, "regular" type
FLEXLOC Self-Locking Nut, external wrenching type

FLEXLOC LOCKNUT DIVISION

SPS
JENKINTOWN PENNSYLVANIA

Reprints from this or other Logbook pages are available for your files. Request them from our Redwood City, California office

Sealing different types of lubricant in full-floating truck axle assembly

Heavy-duty vehicles such as trucks, tractors and off-highway equipment frequently require widely different lubricants for adjoining sections of an assembly. In many cases, oil seals are necessary to prevent intermixing of lubricants as well as preventing entry of dust and dirt to bearing or gear areas.

In the typical full-floating truck axle (Figure 1), special oil to withstand extreme gear loading is used in the differential, and conventional bearing grease at the wheel position. These two lubricants must be retained within assigned areas; they must be kept separate; dust, dirt and mud must be excluded. In the assembly illustrated, this is accomplished through the use of two National Oil Seals of standard design.

A modified National 350,000 seal is installed outboard of the outer roller bearing (Figure 1, "A") to retain gear oil within the differential and axle housing. This is a National Syntech* seal with a precision-molded, precision-trimmed synthetic rubber sealing member, accurately spring tensioned. Accurate concentric positioning of the seal is assured by a special shoulder fitting into the wheel hub bore. Sealing is further improved by riding the sealing lip on a replaceable sleeve press-fitted onto the axle housing.

At the inner bearing position (Figure 1, "B"), a modified National 50,000 series leather seal is employed. This seal retains grease around the bearing and excludes minor amounts of foreign matter. Leather is preferred for this assignment since the seal may frequently run "dry" due to lack of lubrication. National leather seals with impregnated "Nationalized" sealing members are ideal for such semi-starved conditions, as well as other heavy-duty applications of a semi-pressure or semi-dirt nature.

Both seals in this assembly are standard-design National seals modified to meet space limitations of the application. Where sealing problems are critical, special designs are often required to meet pressure, speed, lubricant or temperature conditions. In many applications, however, manufacturers save appreciably on time and tooling costs by utilizing standard-design National Oil Seals. National has tools for over 1,000 such designs—can produce and *ship promptly to your order. For complete information, call the National Oil Seal engineer in your city, or write direct.

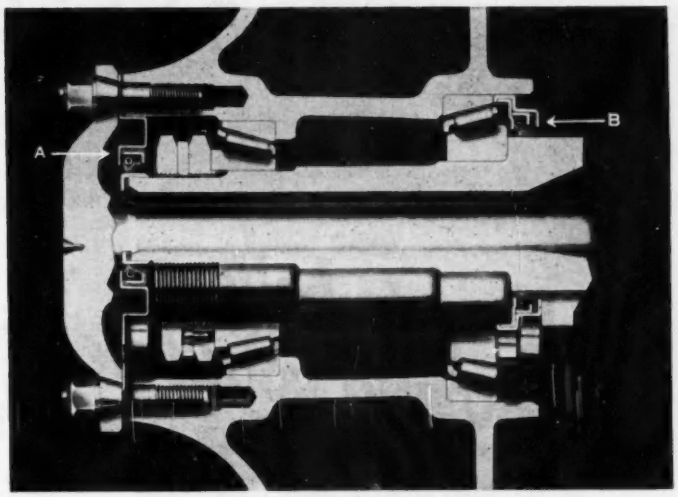


Figure 1. Wheel assembly, full-floating truck axle

Modified National 350,000 Syntech* Seal

Modified National 50,000 Leather Seal

"Let Your Decision be Based on Precision"

NATIONAL OIL AND FLUID SEALS

NATIONAL MOTOR BEARING CO., INC.

General Offices: Redwood City, California
Plants: Redwood City, Calif.; Downey (Los Angeles County), Calif.; Van Wert, Ohio

2349

*Trade Mark Registered

CALL IN A NATIONAL FIELD ENGINEER

BUFFALO, N. Y. . . . . *Room 1124, Prudential Bldg., Mohawk 9222*
CHICAGO, ILL. . . . . *Room 4113 Field Building, Franklin 2-2847*
CLEVELAND, OHIO . *210 Heights Rockefeller Bldg., Yellowstone 2-2720*
DALLAS, TEXAS . . . *30½ Highland Park Village, Justin 8-8453*
DETROIT, MICH. . . . . *726 Lothrop Avenue, Trinity 1-6363*
DOWNEY (Los Angeles Co.), CALIF. . *11634 Patten Rd., Topas 2-8166*
MILWAUKEE, WIS. . . *647 West Virginia Street, Broadway 1-3234*
NEW YORK CITY, N. Y. . *122 East 42nd Street, Murray Hill 6-0171*
PHILADELPHIA, PA. . . . *401 North Broad Street, Bell-Walnut 2-6997*
REDWOOD CITY, CALIF. . . *Broadway and National, Emerson 6-3861*
RICHMOND, VA. . . . . *216 South Fifth Street, Richmond 2-5476*
ROCHESTER, N. Y. . . . . *95 Landing Road, Culver 3531*
WEST SPRINGFIELD, MASS. . . *1025 Elm Street, Springfield 2-1881*
SYRACUSE, N. Y. . . . . *P.O. Box 1224, Baldwinsville 662*
WICHITA, KANSAS . . . . *519 South Broadway, Wichita 2-6971*

The MORAINE -400

Hard to believe a bearing could be so TOUGH!

Tests prove that the new Moraine-400 engine bearings are almost unbelievably tough . . . that they have *six* to *ten* times the life of conventional automotive engine bearings. For example—Moraine-400 bearings were still in good condition after *750* hours of endurance tests—the same tests that cause conventional bearings to fail within *100* hours.

In other tests we reduced the bearing area by one-half, thereby more than doubling the load. Placed in a high-compression automobile engine and run 100 hours at 4300 r.p.m., Moraine-400 bearings were in excellent condition at the end of this tough test.

Overall bearing length ceases to be a limiting factor in automotive engine design when Moraine-400 is used. A shaft of sufficient diameter and rigidity to handle the torque, and journals long enough for good oil-hole design, are all that are required for long bearing life. Moraine-400 operates satisfactorily on both Tocco-hardened and oil-hardened shafts and is outstanding in embedability, conformability and corrosion resistance.

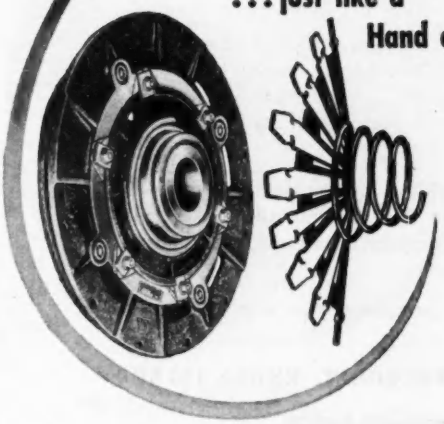
We will soon be in volume production on Moraine-400. They can readily fit into your engine plans for the future.

MORAINE PRODUCTS
DIVISION OF GENERAL MOTORS
DAYTON, OHIO

Moraine-400 is made by the manufacturers of the famous Durex-100 bearings — now used as original equipment on many of the nation's finest cars and trucks.

The SOFT Acting Clutch with the SURE GRIP!

...just like a Hand of Steel in a Velvet Glove



The hand of steel in the Lipe Clutch has 20 fingers that equalize the pressure of a single spring — assuring softer engagement and a positive grip.

LIPE MULTI-LEVER CLUTCH

Lipe's soft engagement, positive grip Multi-Lever Clutch never needs babying. It engages smoothly — without grab, shock or jerk. All parts of the pressure plate touch at the *same instant* with the *same* pressure. No cocking — no point of high slippage and spot burning.

Result: *More mileage between tear-downs.*

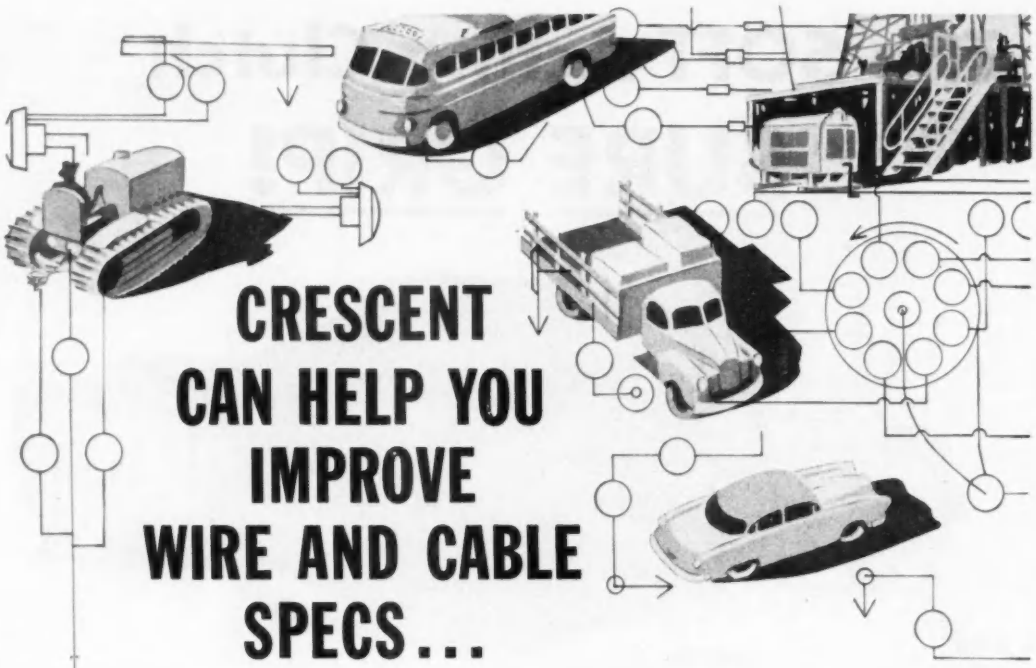
Write for Service Manual and complete data on genuine Lipe parts—stocked in principal cities.

LIPE ROLLWAY

Lipe - ROLLWAY CORPORATION

Manufacturers of Automotive Clutches and Machine Tools

Syracuse 1, N. Y.



CRESCENT CAN HELP YOU IMPROVE WIRE AND CABLE SPECS...

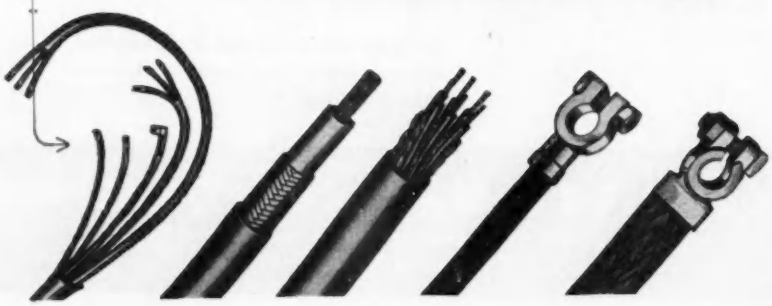
Manufacturers of automobiles, buses, trucks, trailers, aircraft, tractors, industrial and farm power-equipment find that Crescent engineering cooperation means an improvement of wire and cable specs. The end result is substantial savings in assembly costs as well as increased efficiency in starting, lighting, and ignition systems.

Crescent engineering and manufacturing facilities are complete. We draw our own wire. We formulate our own insulation from natural rubber, synthetic rubber, and the latest plastics. Constant laboratory testing maintains uncompromising quality control right from the start.

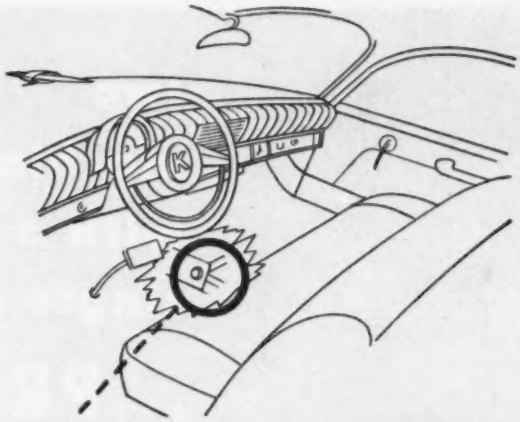
We invite you to discuss the advantage of integrating your engineering with ours. No obligation, of course.

THE CRESCENT COMPANY, INC.. PAWTUCKET, RHODE ISLAND

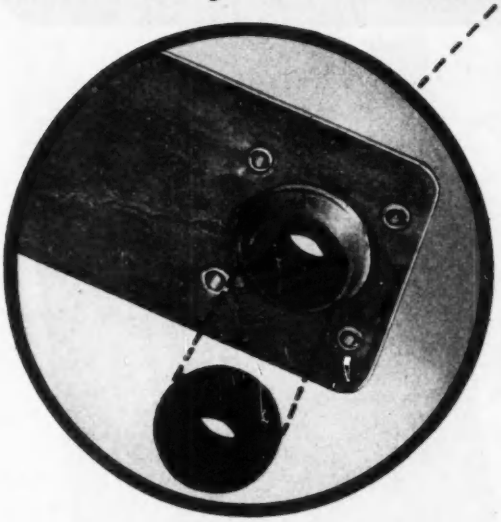
CRESCENT Wire Joe



AUTOMOTIVE WIRE AND CABLE



Du Pont nylon cuts noise in Kaiser clutch assembly



Bearing molded by
The Danielson Mfg. Co., Danielson, Conn.,
for Kaiser-Frazer Corp.,
Willow Run, Mich.

DU PONT
REG. U. S. PAT. OFF.
150th Anniversary
Better Things for Better Living
... through Chemistry
Polychemicals
DEPARTMENT
PLASTICS • CHEMICALS

Nylon bearing needs no lubrication . . . eliminates electrolytic corrosion

In designing their 1952 models, Kaiser engineers sought a material for the clutch cross-shaft bearing that would eliminate noise. But all the materials tested had the same faults. They were noisy, had to be oiled and wore quickly because of electrolytic action.

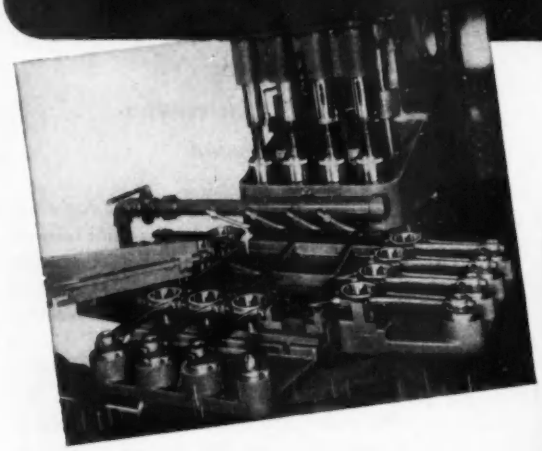
The answer was a bearing molded of Du Pont nylon. According to K-F, nylon was selected "because of the ability of the nylon bearing to operate without lubrication and the absence of electrolytic corrosion." Noise has been eliminated. And nylon's abrasion resistance and unique bearing characteristics have resulted in improved clutch performance.

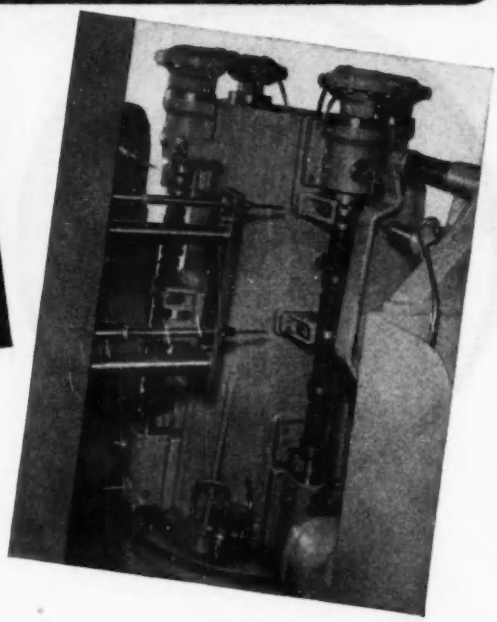
Du Pont nylon is unaffected by gasoline, oil and grease . . . operates at temperatures up to 250°F. Nylon parts can be economically mass-produced to close tolerances by rapid injection-molding.

The outstanding advantages of Du Pont nylon are improving performance and cutting costs in a number of automotive parts, such as clutch and brake bumper seals, windshield wiper gears, and lamp lenses. Its properties may well be of value to you. For full information, write:

E. I. du Pont de Nemours & Co., Inc.
Polychemicals Department; District Offices:
350 Fifth Avenue, New York 1, N. Y.
7 S. Dearborn Street, Chicago 3, Ill.
845 E. 60th Street, Los Angeles 1, Calif.

two machines with a single purpose ...PRODUCTION





Above, four automotive connecting rods have both sides of crankshaft bore chamfered simultaneously. At right is shown one machine drilling four oil holes for camshaft journals and milling keyway for timing gear on automotive camshaft. Both machines illustrated utilize automatic clamping.

When it comes to production —

HARTFORD *Special*

SUPER-SPACERS

Automatic THREAD ROLLERS

THE HARTFORD SPECIAL MACHINERY CO., HARTFORD 12, CONN.

"John, this building of mine holds a cost-cutting *Tip-Off* from ONE BUSINESSMAN TO ANOTHER"

"What is it?" asked John, a prominent appliance manufacturer.

The contractor answered, *"Simply this: don't take your fasteners for granted!*

"An RB&W man showed me how a switch in fasteners could help me make field connections much more economically.

"He suggested switching from rivets to high strength bolts. They cost more than rivets initially, but the assembled cost is much lower. My men work faster than with rivets. The building goes up faster."

You, too, can find a cost-cutting lesson from this story, whether you're in construction* or any other industry.

MORAL: Look to your fasteners for an often overlooked opportunity to reduce costs, and strengthen your competitive position. New inventions, like RB&W's SPIN-LOCK Screw, may prove more efficient than the fasteners you're now using. Or you may save by the stepped-up production you get from using the finest fasteners . . . RB&W bolts, screws, nuts and rivets of uniform accuracy, dependability and physical properties.

Let RB&W help you make the most efficient use of fasteners on your assembly line. Address RB&W at Port Chester.

RB&W—The Complete Quality line. Plants: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices: Philadelphia, Pittsburgh, Detroit, Chicago, Dallas, Oakland. Sales agents: Portland, Seattle. Distributors from coast to coast.

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

*If you're interested in construction, write RB&W at Port Chester for a free reprint of the recent article, "No More Riveting."

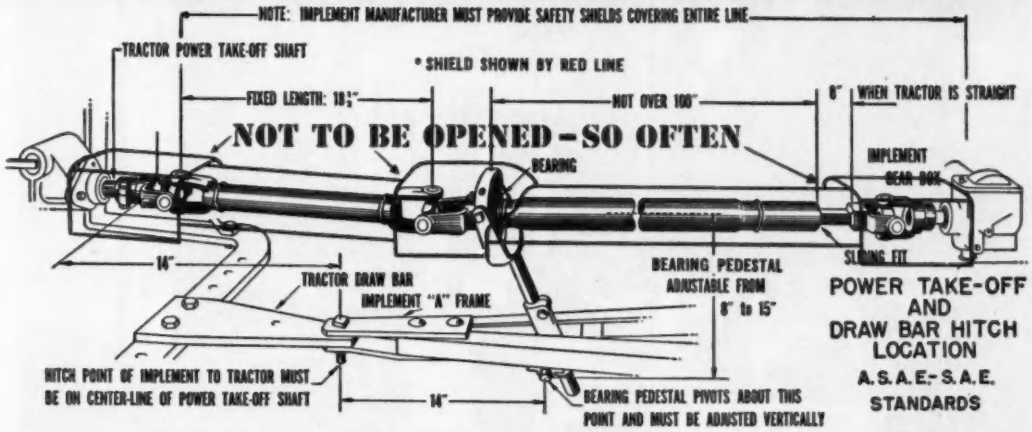
RB&W 107 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

Only Pesco hydraulic pumps offer "pressure loading"

Pressure loading is the exclusive, patented design principle for gear-type hydraulic pumps, which, because it *automatically* compensates for wear, assures maximum efficiencies under all operating conditions, over a long, trouble-free service life. For the complete story, write today.

Pesco Products Division, Borg-Warner Corporation 24700 North Miles Road, Bedford, Ohio

engineering
Pesco
PRODUCTS DIVISION
production


NOTE: IMPLEMENT MANUFACTURER MUST PROVIDE SAFETY SHIELDS COVERING ENTIRE LINE
TRACTOR POWER TAKE-OFF SHAFT
* SHIELD SHOWN BY RED LINE
FIXED LENGTH: 18½"
NOT OVER 100"
0" WHEN TRACTOR IS STRAIGHT
NOT TO BE OPENED – SO OFTEN
BEARING
IMPLEMENT GEAR-BOX
SLIDING FIT
14"
TRACTOR DRAW BAR
IMPLEMENT "A" FRAME
BEARING PEDESTAL ADJUSTABLE FROM 8" to 15"
HITCH POINT OF IMPLEMENT TO TRACTOR MUST BE ON CENTER-LINE OF POWER TAKE-OFF SHAFT
14"
BEARING PEDESTAL PIVOTS ABOUT THIS POINT AND MUST BE ADJUSTED VERTICALLY
POWER TAKE-OFF AND DRAW BAR HITCH LOCATION
A.S.A.E.-S.A.E. STANDARDS

SIZE	TYPICAL APPLICATIONS	RATED H.P. AT 539 R.P.M.
1½ RA	1 - 2 Row Corn Picker — Binders — Small Combines	10 H. P.
2 RA	2 Row Corn Picker — Binders — Large Combines — Windrows	20 H. P.
3 RA	Large Balers — Ensilage Harvesters — Roto Beaters — Etc.	30 H. P.

All drive lines can be supplied with safety slip clutches which can be set for any torque needed.

Operators resent having to stop several times a day to remove safety shields, grease plain bearing joints and replace the shields — or risk breakdowns. Don't let them blame YOUR machine. Specify MECHANICS Roller Bearing UNIVERSAL JOINTS that require, at most, only once-a-season lubrication. The operator will leave the shields on — and won't blame YOUR MACHINE for "joint trouble" — because MECHANICS joints do not waste his time.

MECHANICS UNIVERSAL JOINT DIVISION

Borg-Warner • 2024 Harrison Avenue, Rockford, Illinois

Towmotor loading a truck at Welch Grape Juice Company, North East, Pa.

TOWMOTORS IN ACTION IN U. S. INDUSTRY

cut production costs...

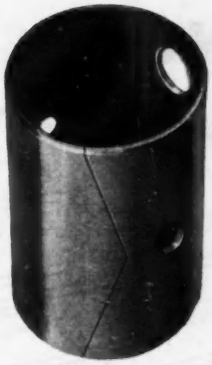
let Towmotor-hours replace costly man-hours. Increase capacity, maintain profits with a Towmotor fork lift truck. Towmotor handles *all* types of material. For the name of your nearest Towmotor representative and copies of Job Studies covering your industry, write Towmotor Corporation, Div. 45, 1226 E. 152nd Street, Cleveland 10, Ohio. Representatives in all principal cities in U. S. and Canada.

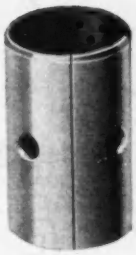
TOWMOTOR
THE ONE-MAN-GANG®

FORK LIFT TRUCKS AND TRACTORS

RECEIVING • PROCESSING • STORAGE • DISTRIBUTION

Bearing performance with Rolled Bushing Economy when you use our Bimetal Bushings





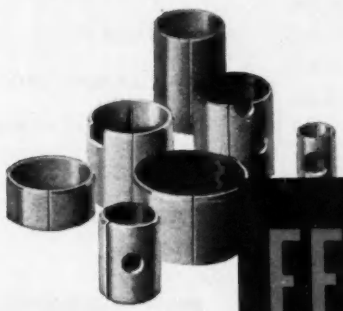
1 BEARING MATERIALS
Bronze, babbitt or copper-lead lining.

2 LOAD-CARRYING STRENGTH
Lining materials bonded to steel backs.

3 LOW-COST PRODUCTION
Rolled from bimetal continuous strip.

4 SPECIAL DESIGN FEATURES
Oil pockets, grooves, holes, notches, windows, cut-outs; V-, lock- or straight butt-seam, etc.

Research, engineering and quality control departments to assist you. Specialized, large-run production facilities. Capacity now available!



FEDERAL-MOGUL

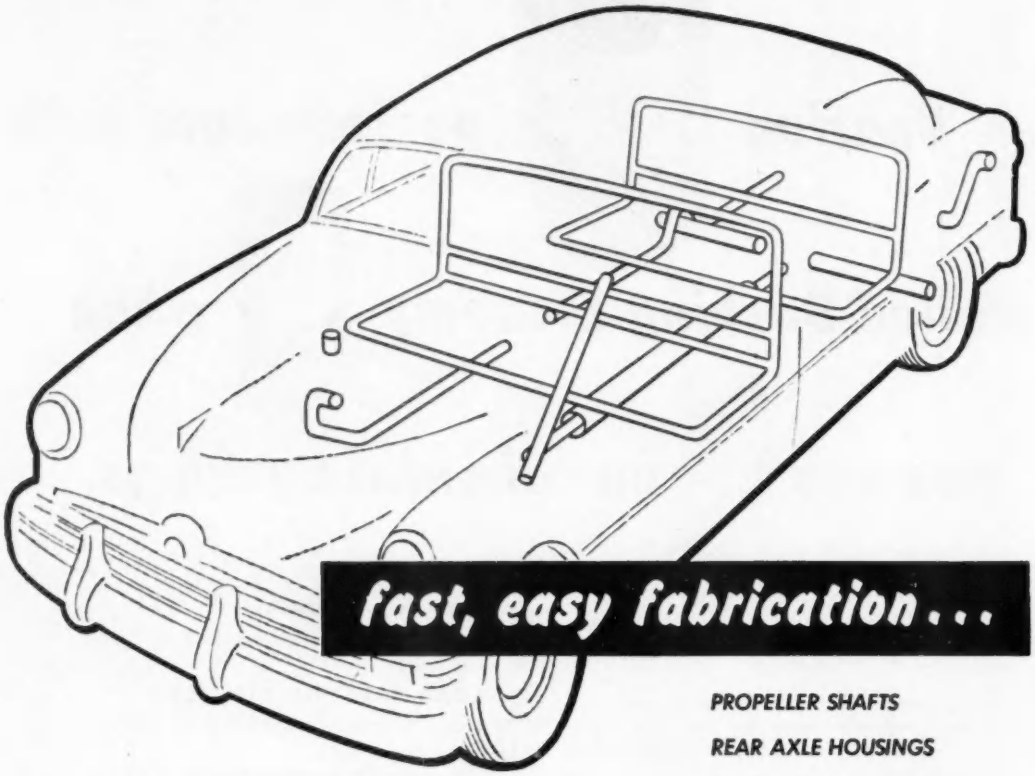
FEDERAL Mogul

Since 1899

Products of our six plants include: Sleeve bearings in all designs and sizes; cast bronze bushings; rolled split-type bushings; bi-metallic rolled bushings; washers; spacer tubes; precision bronze parts and bronze bars.

FEDERAL-MOGUL CORPORATION, 11037 SHOEMAKER, DETROIT 13, MICH.

Brainard TUBING



fast, easy fabrication...

BRAINARD Electric-welded Tubing is a uniform product designed to simplify fabrication . . . it can be beaded, expanded, swaged, spun, flanged, upset, grooved, fluted, flattened, tapered, and otherwise formed. It has good machining qualities, and finish can be supplied as specified. Supplied straight or fabricated, sizes ½" to 4" O.D.; .025 to .180 gage.

Brainard's integrated production facilities assure quality control throughout manufacture . . . from ore to finished tubing. For a dependable source of automotive tubing look to Brainard.

For catalog or further information write Brainard Steel Division, Sharon Steel Corporation, Dept. W-8, Griswold Street, Warren, Ohio. Offices: Atlanta, Baltimore, Buffalo, Chicago, Cincinnati, Cleveland, Columbus, Davenport, Des Moines, Detroit, Grand Rapids, Indianapolis, Milwaukee, Nashua, New York, Philadelphia, Pittsburgh, Rochester, San Francisco, Syracuse, Toledo.

PROPELLER SHAFTS

REAR AXLE HOUSINGS

TAIL PIPES

EXHAUST TUBES

GAS TANK FILLER TUBES

AIR CLEANER TUBES

TUBULAR SEAT FRAMES

STEERING COLUMNS

TORQUE TUBES

Brainard

SHARONSTEEL

STEEL DIVISION

SHARON STEEL CORPORATION

WARREN, OHIO

Why J. I. Case finishes farm combines with RINSHED-MASON ENAMEL

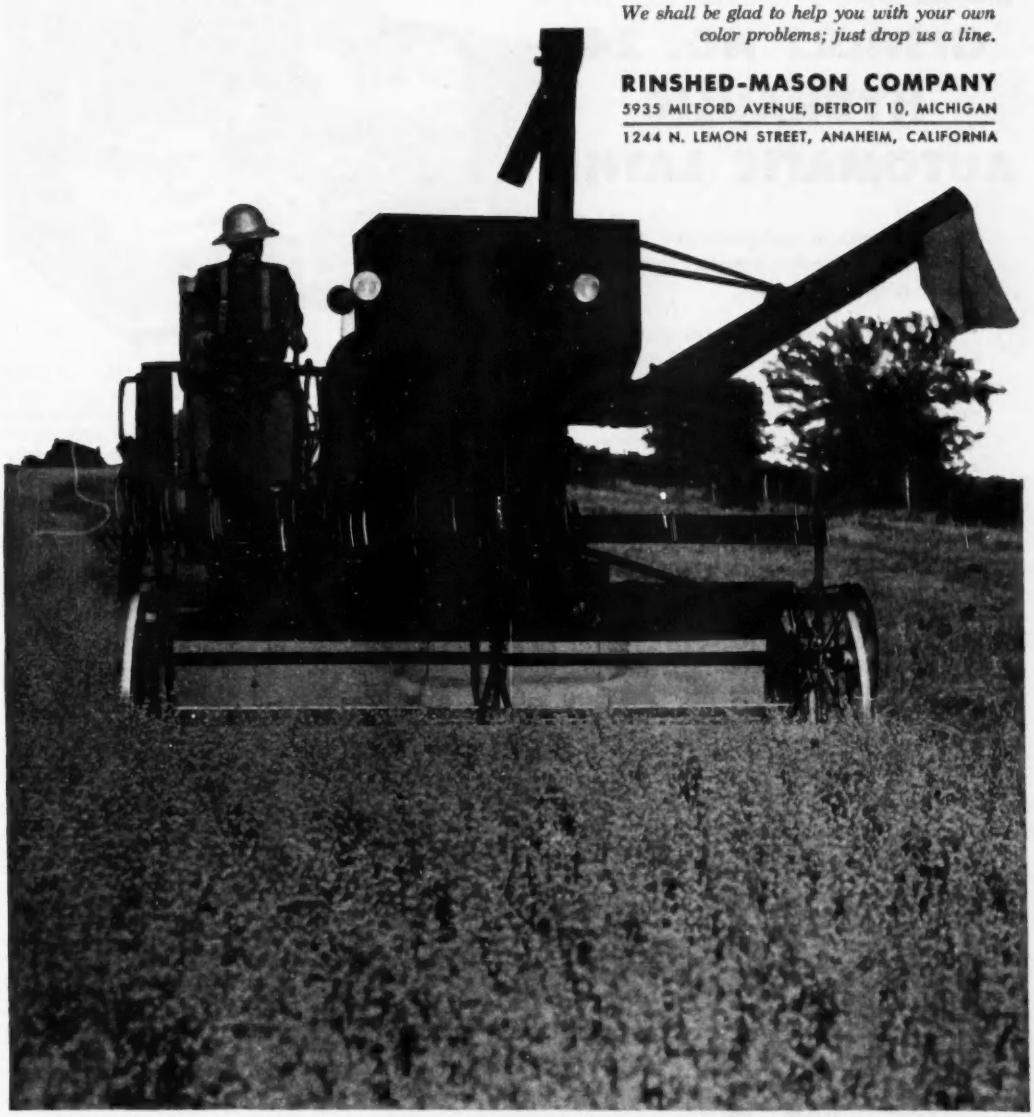
J. I. Case is another one of the world's largest farm equipment manufacturers using Rinshed-Mason enamels . . . because industrial colors carrying the Rinshed-Mason name are scientifically manufactured to exacting customers' specifications. Rinshed-Mason finishes are competitively priced and are delivered on time to meet the busiest factory production schedules.

We shall be glad to help you with your own color problems; just drop us a line.

RINSHED-MASON COMPANY

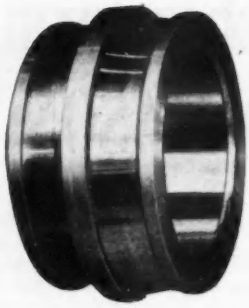
5935 MILFORD AVENUE, DETROIT 10, MICHIGAN

1244 N. LEMON STREET, ANAHEIM, CALIFORNIA



Write today for your copy of a specially prepared U. S. Government Specification Finishes brochure.

SKF RACES *Against Time...*



with the new

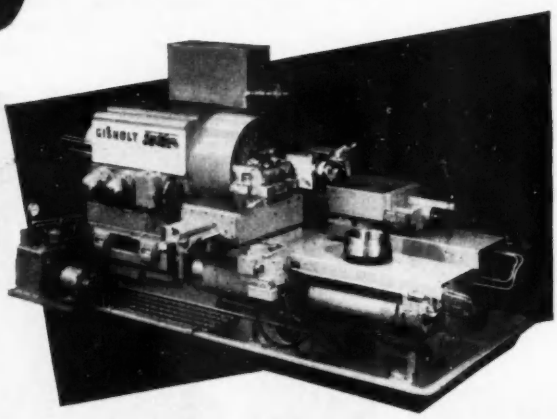
GISHOLT NO. 24 HYDRAULIC AUTOMATIC LATHE

When it comes to fast production of top quality spherical roller bearing races, SKF doesn't fool.

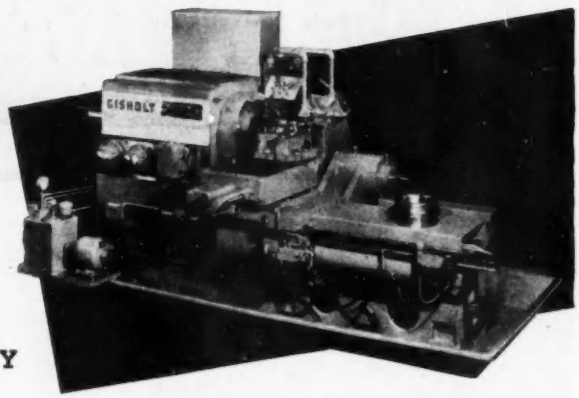
These new Gisholt No. 24 Hydraulics remove 34 lbs. of metal in two operations in a total of only 2.80 minutes' machining time on each of two machines. All cutting is on 52100 bearing steel and done at speeds of 325 to 350 f.p.m.

Speed is important, of course. But precision is the governing factor. How the Gisholt No. 24 does the job is a story that might mean real savings for you, too.

The No. 24 Hydraulic Automatic Lathe is a larger version of the famous No. 12 that has an outstanding success record on hundreds of jobs. If you have large volume precision work up to 24" diameter, the Gisholt No. 24 is the machine to investigate. Write for full information.



First Operation: Chucked on OD with 3-jaw hydraulic chuck, part is turned up to the jaws, faced, chamfered, bored and bore radius formed. Cam relief on rear tool block turns boring bit clear of workpiece as it is withdrawn.



Second Operation: Part held on expanding arbor by hydraulic pressure is finish turned, faced, chamfered and bore radius formed. Special rocker arm type carriage at rear tips in shaving tools to form both roller grooves with feed of .003" to .0045."

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

THE GISHOLT ROUND TABLE *represents the collective experience of specialists in machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.*

GISHOLT

TURRET LATHES • AUTOMATIC LATHES
SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

(Advertisement)

BUSINESS IN MOTION

To our Colleagues in American Business . . .

For several years this space has been used to tell how Revere has collaborated with its customers, to mutual benefit. Now we want to talk about the way our customers can help us, again to mutual benefit. The subject is scrap. This is so important that a goodly number of Revere men, salesmen and others, have been assigned to urge customers to ship back to our mills the scrap generated from our mill products, such as sheet and strip, rod and bar, tube, plate, and so on. Probably few people realize it, but the copper and brass industry obtains about 30% of its metal requirements from scrap. In these days when copper is in such short supply, the importance of adequate supplies of scrap is greater than ever. We need scrap, our industry needs scrap, our country needs it promptly.

Scrap comes from many different sources, and in varying amounts. A company making screw-machine products may find that the finished parts weigh only about 50% as much as the original bar or rod. The turnings are valuable, and should be sold back to the mill. Firms who stamp parts out of strip have been materially helped in many cases by the Revere Technical Advisory Service, which delights in working out specifications as to dimensions in order to minimize the weight of trimmings; nevertheless, such manufacturing operations inevitably produce scrap. Revere needs it. Only by obtaining scrap can Revere, along with the other companies in the copper and brass business, do the utmost possible in filling orders. You see, scrap helps us help you.

In seeking copper and brass scrap we cannot appeal to the general public, nor, for that matter, to the small businesses, important though they are, which have only a few hundred pounds or so to dispose of at a time. Scrap in small amounts is taken by dealers, who perform a valuable service in collecting and sorting it, and making it available in large quantities to the mills. Revere, which ships large tonnages of mill products to important manufacturers, seeks from them in return the scrap that is generated, which runs into big figures of segregated or classified scrap, ready to be melted down and processed so that more tons of finished mill products can be provided.

So Revere, in your own interest, urges you to give some extra thought to the matter of scrap. The more you can help us in this respect, the more we can help you. When a Revere salesman calls and inquires about scrap, may we ask you to give him your cooperation? In fact, we would like to say that it would be in your own interest to give special thought at this time to all kinds of scrap. No matter what materials you buy, the chances are that some portions of them, whether trimmings or rejects, do not find their way into your finished products. Let's all see that everything that can be re-used or re-processed is turned back quickly into the appropriate channels and thus returned to our national sources of supply, for the protection of us all.

REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

Executive Offices: 230 Park Avenue, New York 17, N. Y.

SEE REVERE'S "MEET THE PRESS" ON NBC TELEVISION EVERY SUNDAY

HARDENING TIME CUT 62%

with TOCCO* Induction Heating

When minutes saved mean dollars earned, look to TOCCO Induction Heating

● Singer Manufacturing Co., makers of famous Singer Sewing Machines, reports the following results when they switched to TOCCO—hardening the shaft assemblies shown above. Note the operations eliminated through the use of TOCCO and the savings of 151.8 minutes per 100 parts.

OLD METHOD Operation	Min./100 Pcs.	TOCCO METHOD Operation	Min./100 Pcs.
Assemble on plating racks. .	23.0	eliminated	
Copper plate crank end . . .	43.0	eliminated	
Remove from plating racks .	15.0	eliminated	
Harden shaft and anneal crank	120.0	TOCCO harden and clean	92.5
Strip lead.	10.0	eliminated	
Strip copper and clean . . .	33.3	eliminated	—
Old method total time	244.3 minutes	TOCCO method total time . . .	92.5 minutes

Have you investigated TOCCO's time and cost savings possibilities for your hardening, brazing, forging or melting operations? It will pay you to write or send blueprints of your parts for analysis—no obligation of course.

SEND FOR OUR CATALOG

THE OHIO CRANKSHAFT COMPANY • CLEVELAND 1, OHIO

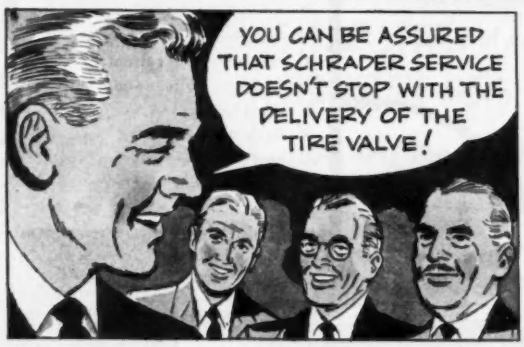
TOCCO

Induction Heating Equipment must meet the requirements of the Federal Communication Commission's Rules and Regulations Relating to Industrial, Scientific and Medical Services, Part 18. All TOCCO equipment is certified to comply with these rules and regulations.

Schrader Contributions to the Tire Industry

Our world-wide service protects your reputation

YOUR NEW TIRES WITH NEW SCHRADER STANDARD TIRE VALVES GO ALL OVER THE WORLD YEAR AFTER YEAR. SOME TIRES AND VALVES WILL BE ABUSED AND NEED REPAIRS.
BUT, AND THIS IS AN IMPORTANT POINT TO YOU, WHEREVER TIRES GO SCHRADER MAINTAINS THE REPLACEMENT PARTS THE KNOW HOW AND THE SERVICE!
WE MAINTAIN STOCKS IN WAREHOUSES AND WITH DEALERS IN EASY-TO-USE, EASY-TO-STORE PACKAGE UNITS. AND WE DISTRIBUTE "HOW-TO" FACTS ABOUT CARS, SERVICE MAINTENANCE OF TIRE VALVES TO HUNDREDS OF THOUSANDS OF TIRE SERVICE MEN.



Schrader service backs you right down to your own customer . . . the consumer. Whether he is a fleet operator with 500 trucks or your neighbor with the family car . . . Schrader provides all the information and equipment to dealers everywhere to help your customer get all the miles you built into your tires.

A. SCHRADER'S SON, 470 VANDERBILT AVE., BROOKLYN 17, N. Y.
Division of Scovill Manufacturing Company, Incorporated

Schrader
REG. U. S. PAT. OFF.

FIRST NAME IN TIRE VALVES
FOR ORIGINAL EQUIPMENT AND REPLACEMENT

Not A Flight of Fancy

HERE ARE WAYS CHIKSAN CAN HELP AIRFRAME MANUFACTURERS

The airplane shown here is not an actual picture of any one plane. Rather, it is a composite to show some of the varied ways in which Chiksan planning can help the airframe manufacturer do a better job.

Fuel, oil, water, air and oxygen all find dependable, safe, uninterrupted flow through Chiksan aero-hydraulic swivel joints and assemblies.

CHECK THESE APPLICATIONS IN YOUR BLUEPRINTS:

- A. Refueling boom assembly
- B. Steering control mechanism
- C. Brake system
- D. Spoiler actuating mechanism
- E. Fuel and oil lines
- F. Adjustable sweep-back system
- G. Emergency dump chute
- H. Flap actuating system
- I. Power-plant fuel and oil lines
- J. Wing fold
- K. De-icing system
- L. Power control system
- M. Stabilizer trim

The Flow of Enterprise Relies on

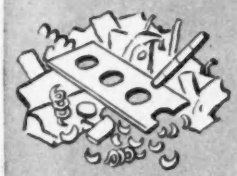
CHIKSAN

Ball-Bearing Swivel Joints

REPRESENTATIVES IN PRINCIPAL CITIES

A few of the many Chiksan aero-hydraulic swivel joints made for pressures ranging from 1000 to 3000 psi.

HOW THE *SCRAP* THAT JACK MADE —MADE JACK *AND MORE*



This is the Scrap that Jack made.

This is the Man who found the Scrap that Jack made.

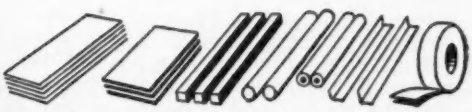
This is the Clerk who was called by the Man who found the Scrap that Jack made.

This is the Dealer who dealt with the Clerk who was called by the Man who found the Scrap that Jack made.

AND TO MAKE THE STORY SHORTER:

This is the jack the dealer paid for the Scrap that Jack made.

AND THIS IS THE STEEL THAT INDUSTRY GETS

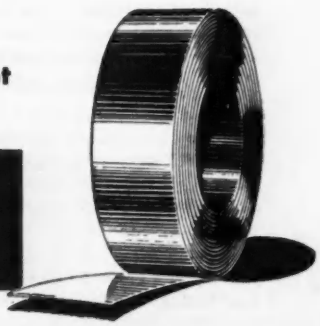


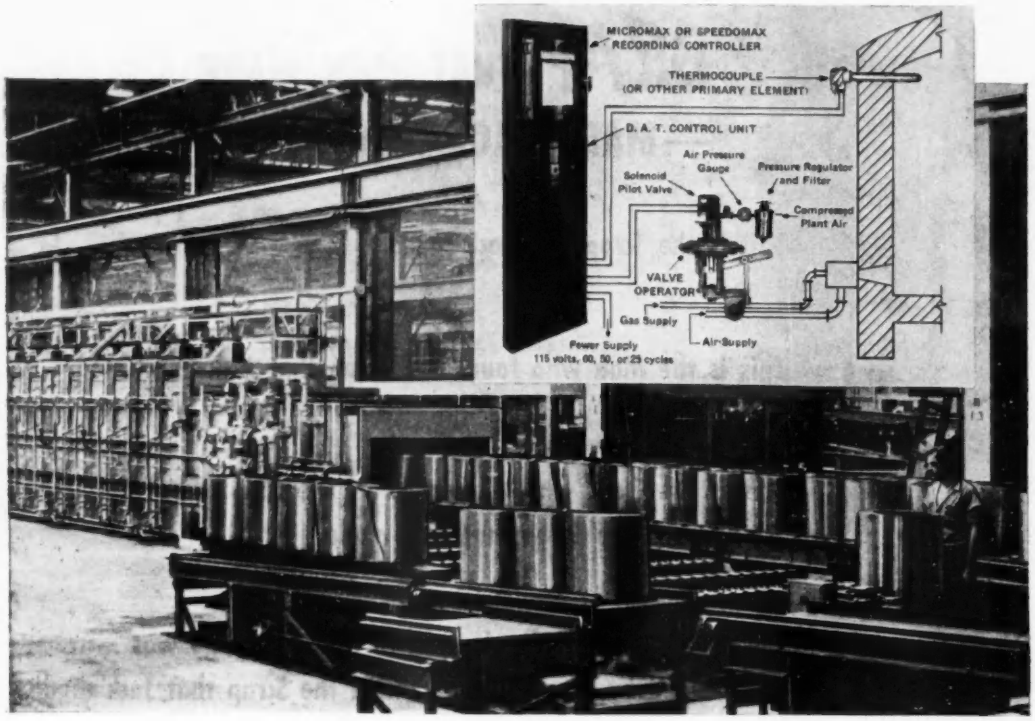
from the Scrap that Jack made!

MORAL:

Check your Plant for Scrap Today and Get it Moving—*That* Pays Everybody!

Superior Steel
CORPORATION
CARNEGIE, PENNSYLVANIA





THIS "package" OF CONTROL FITS ITSELF TO FURNACE NEEDS

. . . and only L&N can supply all its features!

• Scovill Manufacturing Company credits pyrometric control of their 119-foot annealing furnaces with a big part in helping to produce the most uniform, high-quality brass they've ever made. Each furnace anneals sheet in 2000 lb. coils and has a capacity of 32,500 lbs. per hour. The four furnaces were built by Surface Combustion Co. and The Electric Furnace Co. for Scovill's 10 million dollar continuous strip mill.

Scovill's success in controlling temperatures is timely because it shows what can be done with thousands of other industrial furnaces. Small units may need only one instrument, instead of Scovill's five per furnace.

But the principle is the same.

Instead of arbitrarily turning fuel "on" at a predetermined low temperature, and "off" at a predetermined high, D.A.T. alternately turns heat on and off—flexibly adapting the periods of on-time to the needs of the furnace. When temperature begins to rise above the set-point, the periods of on-time become shorter. When temperature falls, periods of on-time grow longer. In this way, D.A.T. exactly adapts its action to the upsets, load changes and lags of the furnace. This means it holds temperature in line for all normal changes in furnace charge, ambient temperature, temperature control point, etc.

Increased production resulting from unusual uniformity is the great advantage of D.A.T. but other points are worth remembering:

Fuel can often be saved because less heat is lost up the stack.

Valve and burner sizes are not particularly critical.

D.A.T. can often modernize an old furnace, because it's so easy to install.

D.A.T. operates equally well on furnaces of full-muffle, semi-muffle, open firing and conventional radiant-tube design.

D.A.T. is just one of several L&N Controls. Call us for service or information in selecting equipment for any temperature-control problem. Address nearest office or 4966 Stenton Ave., Philadelphia 44, Penna.

LEEDS & NORTHRUP

instruments • automatic controls • furnaces

Jrl. Ad. N-38-626 (7)

You Know Faster— and Positively

whether a dimension is acceptable or not when you use . . .

FEDERAL

DIAL INDICATING GAGES

. . . and you know *how much* wrong a non-acceptable dimension is, which is also valuable information.

There are thousands of jobs that could gain valuable help from the correct use of the right gage. Federal can help because of its concentrated experience in applying every type of Dial Indicator and Gage to every imaginable need.

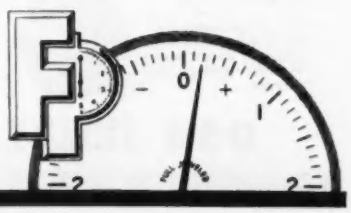
Because Federal designs and makes *all types* we can be impartial and furnish a Gage from a wide selection of stock type Indicators and Gages. Or, we can apply our wide experience in designing Special Gages with the chances strongly in favor of their not having in them the "bugs" which often occur in gages made by the user.

The experience of designing over 25,000 Gages of every conceivable type and know-how in making them so they will tell the truth should be worth something to you.

Send for catalog or tell us your requirements and we will recommend a Gage to tell you quickly and positively what you want to know. **FEDERAL PRODUCTS CORPORATION, 1268 Eddy St., Providence 1, Rhode Island.**

FEDERAL

Largest manufacturer devoted exclusively to designing and manufacturing *all types* of DIMENSIONAL INDICATING GAGES



THE BASIC SHAPE IS ALREADY MADE WHEN YOU USE

Shelby Seamless

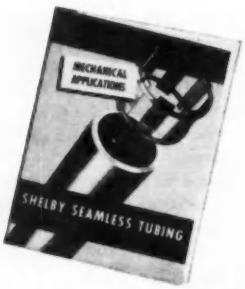
● You can do practically anything with a tube that you can do with a solid round bar—and you save the cost of the hole.

Thousands of machine shops take advantage of this fact and produce high quality machined parts at savings up to 50% with the aid of Shelby Seamless Mechanical Tubing.

Boring and extensive machining can be minimized—sometimes eliminated—with Shelby Seamless. You save time, labor, materials, as well as wear and tear on expensive tools. You can often select just the right tube for your job, because Shelby Seamless is made in so many sizes, wall thicknesses, steel grades and finishes. Some shops find they can simply cut the tube to length, and with a clean-up finishing operation, the job is through.

When you get into *volume* production, it's reassuring to know that with Shelby Seamless, uniformity can be taken for granted, due to our tightly controlled manufacturing process. Whether you make one part, or hundreds or tens of thousands, this dependable uniformity makes it possible to closely estimate your time, labor and material.

Our engineers will be glad to help you utilize the many advantages of Shelby Seamless for your product. Meantime, send for our free Bulletin Number 17. It may help you cut time and costs—and make a better product in the bargain.



All National Seamless Tubes are pierced from a billet of high quality steel. This is the one manufacturing method that assures absolutely uniform wall strength.

NATIONAL TUBE DIVISION, UNITED STATES STEEL COMPANY, PITTSBURGH, PA.
(Tubing Specialties)

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

U·S·S SHELBY SEAMLESS MECHANICAL TUBING

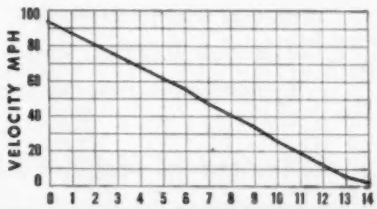
UNITED STATES STEEL

How to absorb 25 million FT-LBS of energy in 1000 feet!

This deceleration chart shows what happens when a pilot brings his 20 ton ship in for a landing. During this stop, terrific heats and pressures are created. Yet planes must stop safely... and quick!

American Brakeblok attacked this problem during World War II. Working closely with aviation brake manufacturers we developed the formulas to do the job. We helped solve some very difficult manufacturing problems, created mass-production methods and equipment.

Today we are a major supplier of aviation brake lining. Our research laboratories, manufacturing facilities and years of experience are ready to serve—either for military or civilian needs.



American Brakeblok

THE SAFETY BRAKE LINING

Brake Shoe

Copyright 1952—American Brake Shoe Co.

AMERICAN BRAKEBLOK DIVISION
DETROIT 9, MICHIGAN

The Crankshaft

—probably the most important single part in the modern high-speed, high-compression, internal-combustion engine.

Wyman-Gordon—specialists in the design and forging of crankshafts since the start of the automotive industry—furnished the first heat-treated crankshaft, forged the first six-throw crankshaft, forged the first eight-throw crankshaft, forged the first crankshaft with integral counterweights. In automotive crankshafts and in all types of aircraft forgings, steel and light alloy, there is no substitute for Wyman-Gordon experience.

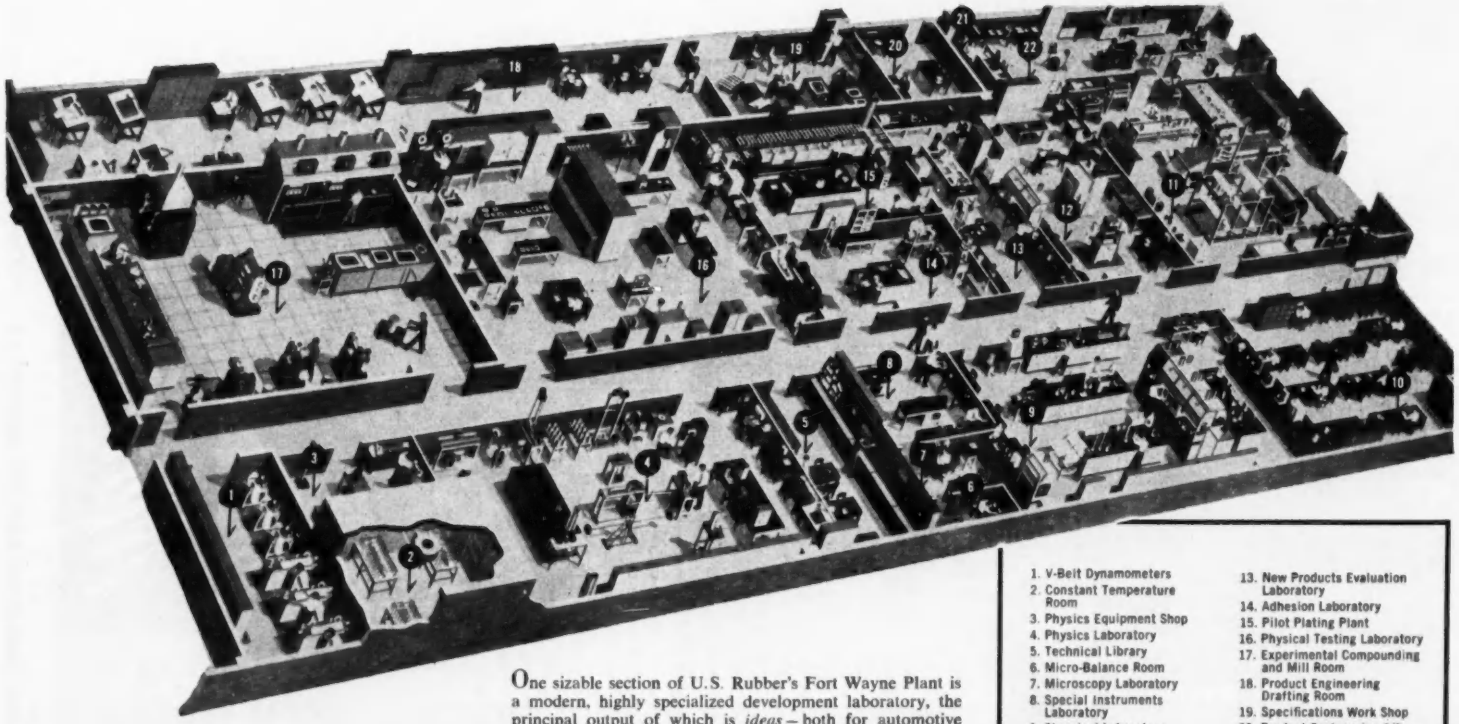
Standard of the Industry for More Than Sixty Years

WYMAN-GORDON

FORGINGS OF ALUMINUM • MAGNESIUM • STEEL

WORCESTER, MASSACHUSETTS

HARVEY, ILLINOIS DETROIT, MICHIGAN



1. V-Belt Dynamometers
2. Constant Temperature Room
3. Physics Equipment Shop
4. Physics Laboratory
5. Technical Library
6. Micro-Balance Room
7. Microscopy Laboratory
8. Special Instruments Laboratory
9. Chemical Laboratory
10. Technical Office
11. New Products Laboratory
12. New Products Pilot Plant
13. New Products Evaluation Laboratory
14. Adhesion Laboratory
15. Pilot Plating Plant
16. Physical Testing Laboratory
17. Experimental Compounding and Mill Room
18. Product Engineering Drafting Room
19. Specifications Work Shop
20. Product Engineering Office
21. Dark Room
22. Metallographic Laboratory

Idea Factory for the Automotive Industry

One sizable section of U.S. Rubber's Fort Wayne Plant is a modern, highly specialized development laboratory, the principal output of which is *ideas* – both for automotive manufacturers and the military.

Here, carefully chosen technicians apply their skills and experience to the creation and perfecting of rubber-bonded-to-metal, all-rubber, and plastic parts. Working closely with customers' engineering staffs, they are producing many new and often revolutionary designs to meet changing needs.

You will be interested in a booklet, "This is Your Laboratory," explaining the unique service this U.S. Rubber unit is performing. Address: Engineered Rubber and Plastic Parts, Mechanical Goods Division, United States Rubber Company, Rockefeller Center, New York 20, N. Y.

PRODUCT OF

U.S.RUBBER
SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION · ROCKEFELLER CENTER, NEW YORK 20, N. Y.

. . . untouched by human hands!

. . . to plus-or-minus .035 oz.!

. . . at 12 per minute rate!

pistons balanced automatically

. . . by this amazing new

Morris

AUTOMATIC PISTON BALANCING MACHINE

For the first time, this MORRIS Mor-Speed Production Machine makes piston balancing 100% automatic. Parts are unloaded automatically from a standard conveyor, processed or rejected and returned to the conveyor "untouched by human hands."

Underweight or grossly overweight pistons are automatically rejected without interrupting the production flow. Depending on a cycle time ranging from 5 to 8 seconds per part, production is 450 to 720 parts per hour varying with the amount of metal to be removed from each piece at 80% efficiency and to a plus-or-minus one gram accuracy limit!

MORRIS Automatic Piston Balancing Machines are used by a number of the major automotive producers. If you have a piston production line, let Morris Engineers show you case history proof of time, labor, money and floor space savings.

Write today for NEW bulletin describing and illustrating the revolutionary MORRIS Piston Balancing Machine.

The Morris Automatic Piston Balancing Machine takes only 27.3 square feet of floor space to turn out up to 12 accurately balanced pistons every minute!

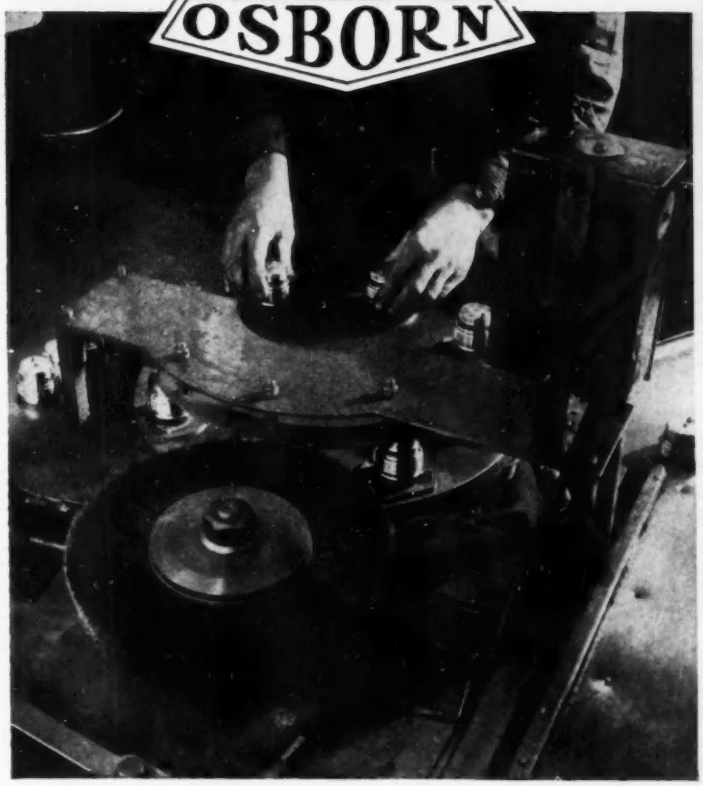
a better product at less cost with precision PLUS *production*

Collins & Aikman MOR-SPEED Lines

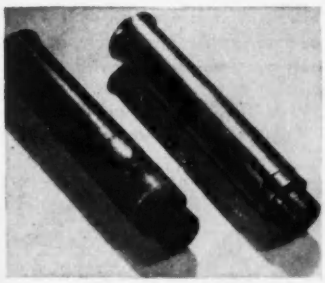
Morris

THE MORRIS MACHINE TOOL COMPANY, 938 HARRIET ST., CINCINNATI 3, OHIO

OSBORN



"CENTERLESS BRUSHING" speeds the production of fine finishes for cylindrical parts such as this compressor piston. One user of this Osborn-developed method gets micro-smooth finishes at outputs as high as 10,000 pistons per 8 hours. Can be applied to many sizes of parts and types of material.



CLEANS SCALE. Heat treat scale on the tube at the left is removed by Osborn power brushing. Result, shown at right, is perfectly clean surface, ready for painting. Have an **OBA** study your product cleaning operations to find ways to cut their cost.

Why 400? Deburr 1400 per hour!

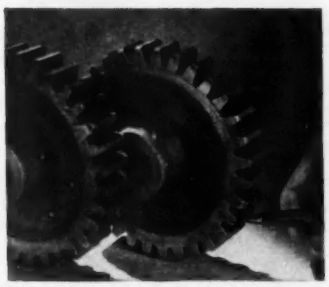
Here's how a manufacturer of brass components for ammunition has stepped up production with Osborn Power Brushing:

In the removal of feather burrs from threads and the machined surface of these brass parts, former output was 400 per hour. With the help of the **O**sborn **B**rushing **A**nalyst, this company designed the brushing machine shown. The parts are placed on spindles of a rotating table. As they pass the Osborn Monitor Brush, they rotate and expose the entire face uniformly to the brush. Parts come clean and smooth . . . at a rate of 1400 per hour! And in another machine, Osborn Brushes deburr the internal threads of this part . . . smooth and fast!

Have the **OBA** show you production-boosting ideas for your shop! Call today or write, *The Osborn Manufacturing Company, Dept. 797, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

Osborn Brushes

OSBORN POWER, MAINTENANCE AND PAINT BRUSHES AND FOUNDRY MOLDING MACHINES

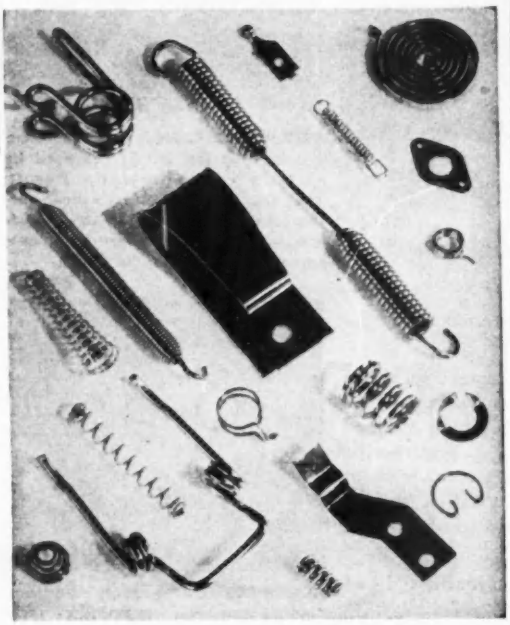


FASTER DEBURRING. Here's another "before and after" example of gear deburring with the Osborn Work Holder Brushing Lathe. Burrs and sharp edges are removed uniformly. Production increases of 20% to 1570% are being reported by users.

WHAT'S YOUR PROBLEM?
The **O**sborn **B**rushing **A**nalyst will gladly help. Call him today!

When you receive a shipment of springs from U. S. Steel Wire Spring you can always be sure they'll "measure up" to requirements. We maintain complete testing and inspection facilities to make certain the springs we produce meet all specifications. Regardless of the size of your order, it gets this same special service.

Producing Clutch Pressure Springs . . . Clutch Dampener Plate Springs



The U. S. STEEL WIRE SPRING Co.

7800 FINNEY AVE. • MICHIGAN 1-6315

CLEVELAND 5, OHIO

Men at Work

in the private offices and in all corners of automotive and aviation industrial manufacturing plants, influence the buying of materials, tools, machinery and equipment.

In addition to the buyers whom your own salesmen contact

AUTOMOTIVE INDUSTRIES

reaches men whose names you'll never know — but whose recommendations may mean millions to you.

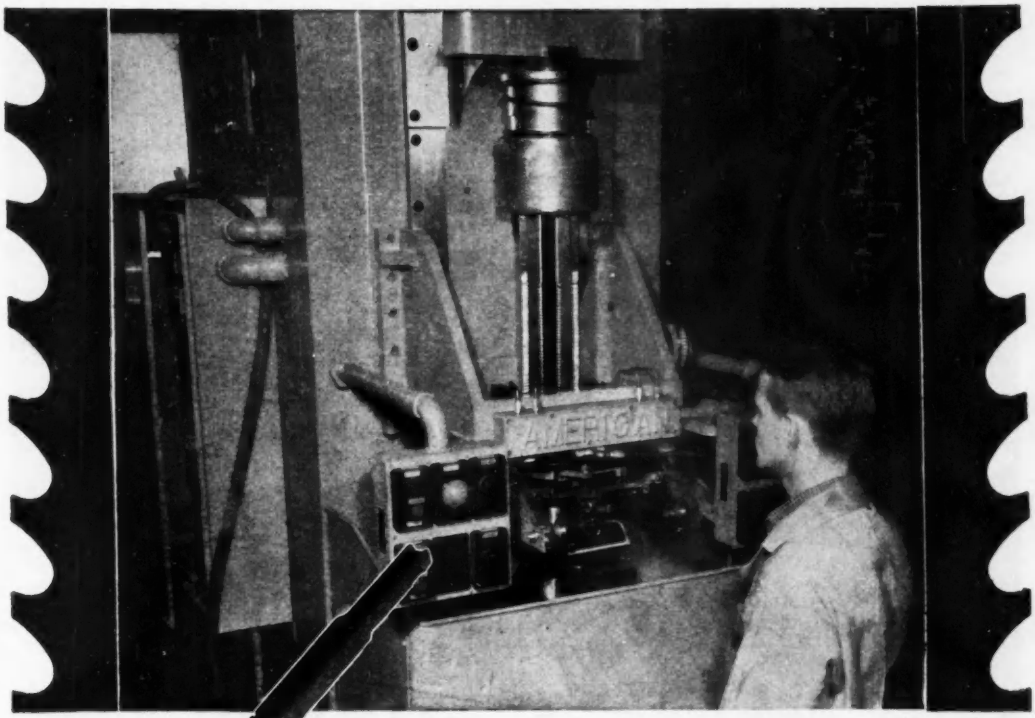
Also Automotive Industries helps to create and maintain the good reputation of your product in quarters where that help will do the most good

---

Automotive Industries

A Chilton Publication

Chestnut & 56th Sts. Philadelphia 39, Pa.



ONE PASS *Broaches* SIX WINDOW OPENINGS

Typical result engineered the *American* way

A special, large, American-engineered, automatic, six station pull head, on a standard American VP 3-10-30 Vertical broaching machine, helps to speed production on this automatic transmission part. A total of twelve angular sides, plus twenty-four corner radii are finish broached on 150 of these steel forged parts per hour. The machine is equipped with an American-engineered fixture with a manually operated work slide interlocked with the machine cycle for maximum safety.

Developing jobs of this type is an everyday occurence at American Broach. Your broaching job benefits from the skill and experience of American engineers . . . engineers who design all three . . . broaches, broaching machines and broaching fixtures. Remember, the best way to do your job within cost and production requirements . . . is the American Way.

Write for our new Blue & Gold catalog containing complete machine specifications. Address Dept. A.

AMERICAN *American* BROACH & MACHINE CO.

A DIVISION OF SUNDSTRAND MACHINE TOOL CO.

ANN ARBOR, MICHIGAN

SUNDSTRAND

See *American* First — for the Best in Broaching Tools, Broaching Machines, Special Machinery

MARKEM®

marks them all

FROM ARTILLERY SHELLS TO MEDICAL AMPULES

MASTERS OF MARKING — Since 1911

Markem methods, machines, type and inks have been marking the products of industry for forty years. Markem machines can mark up to many thousands of pieces per hour. They make clear, durable imprints on flat, curved or irregular surfaces of paint, paper, wood, glass, metal, leather, plastic, rubber, fabric, composition and pressure sensitive tapes. No special skill is needed for their operation. Legend and color of imprint may be quickly and easily changed.

MAKE YOUR MARK WITH MARKEM

When your products need marking for Identification, Control or Market — ask Markem. Submit your problem, together with a sample of the item to be marked. Markem Machine Company, Keene 8, New Hampshire.

MARKEM BETTER MARKING SINCE 1911

HI-EFF BALANCING

- *Fast*
- *Accurate*

This 250-pound blower fan is being balanced to a 1 ounce inch on a HI-EFF Balancing Machine. The same Balancer is used for a wide variety of pieces up to 1200 pound size. It provides rapid balancing with accuracy indicated by the following tolerances:

Pieces weighing 500 to 1200 pounds, within 2 oz. inches.

Pieces weighing 75 to 500 pounds, within 1 oz. inch.

Pieces of lighter weights to diminishing tolerances down to .02 oz. inch.

HI-EFF Balancing machines are available in 5 sizes with work piece diameters up to 48 inches. These may be equipped with HI-EFF Hand Weighing Mechanism (as shown) or HI-MAX Direct Reading Mechanism. Write for folder "Balance Your Product."

TAYLOR DYNAMOMETER AND MACHINE COMPANY

528 A West Highland Avenue, Milwaukee 3, Wisconsin

Manufacturers of HI-EFF Hydraulic Dynamometers — Static Balancing Machines — Sensitive Drilling Machines.

Speed Nut
SAVINGS STORIES

TINNERMAN "ACES"...

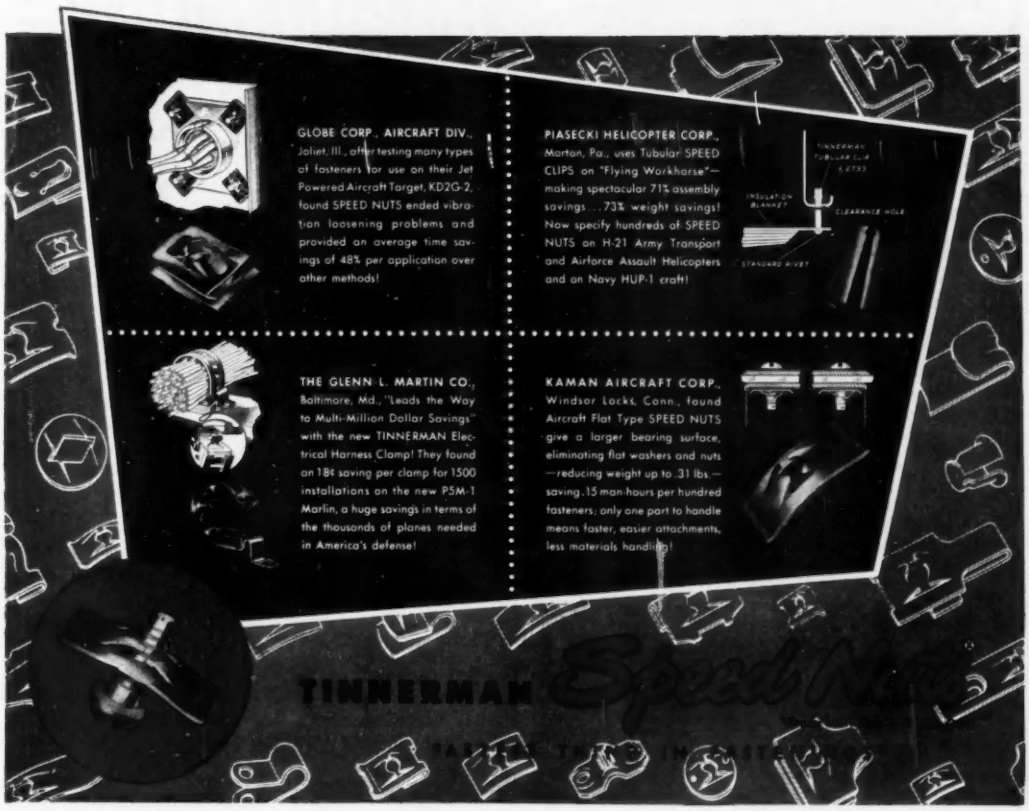
shoot down production costs

...rack up huge assembly savings!

Here's how Vibration-Proof SPEED NUT brand fasteners save weight, assembly time, materials handling... step-up product quality.

SPEED NUTS are busy everywhere in industry, making lightning-fast, self-locking attachments...saving manufacturers thousands of dollars and stepping-up production to new highs! The examples of SPEED NUT savings in the aircraft applications illustrated here are typical results of Tinnerman fastening engineering know-how. Whether you build aircraft, or automotive assemblies, there's a SPEED NUT way to really important savings through better fastening methods!

Savings Stories like these are "born" through the application of engineering experience and know-how in the fastening field. Thousands of standard Tinnerman SPEED NUTS in various types and sizes are available to meet your fastening needs or a special fastener may be developed for your product. A FREE comprehensive FASTENING ANALYSIS Service is yours for the asking... call the Tinnerman representative in your area for complete details. Also, write today for your copy of "SPEED NUT Savings Stories", a bookful of eye-opening savings made by SPEED NUT users: TINNERMAN PRODUCTS, INC., Dept. 12, Box 6688, Cleveland 1, Ohio. In Canada: Dominion Fasteners Ltd., Hamilton. In Great Britain: Simmonds Aerocessories, Ltd., Treforest, Wales. In France: Aerocessoires Simmonds, S. A.—7 rue Henri Barbusse, Levallois (Seine) France.


GLOBE CORP., AIRCRAFT DIV., Joliet, Ill., after testing many types of fasteners for use on their Jet Powered Aircraft Target, KD2G-2, found SPEED NUTS ended vibration loosening problems and provided an average time savings of 48% per application over other methods!
PIASECKI HELICOPTER CORP., Morton, Pa., uses Tubular SPEED CLIPS on "Flying Workhorse"—making spectacular 71% assembly savings ... 73% weight savings! Now specify hundreds of SPEED NUTS on H-21 Army Transport and Airforce Assault Helicopters and on Navy HUP-1 craft!
THE GLENN L. MARTIN CO., Baltimore, Md., "Leads the Way to Multi-Million Dollar Savings" with the new TINNERMAN Electrical Harness Clamp! They found an 18¢ saving per clamp for 1500 installations on the new P5M-1 Marlin, a huge savings in terms of the thousands of planes needed in America's defense!
KAMAN AIRCRAFT CORP., Windsor Locks, Conn., found Aircraft Flat Type SPEED NUTS give a larger bearing surface, eliminating flat washers and nuts —reducing weight up to .31 lbs.— saving .15 man-hours per hundred fasteners; only one part to handle means faster, easier attachments, less materials handling!
TINNERMAN

NORTH AMERICAN USES

Lube-Lok

Bonded to Metal Lubrication

ON

FLAP TRACKS

Lube-Lok fights friction on North American's FLAP TRACKS . . . provides lubrication at critical low temperatures encountered at high altitudes.

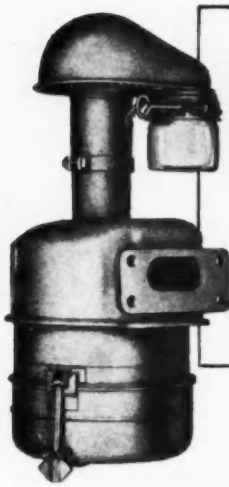
Every day Lube-Lok solves critical lubrication problems for aircraft industries, armed services, etc.

NATION-WIDE PROCESSING PLANTS

Albuquerque, N. M., Machine Engineering Service
Chicago, Ill., Metro Electro Processing Corp.
Colorado Springs, Colo., Gagnon Plating & Mfg. Co.
Detroit, Mich., Parker-Wolverine, Div. of the Udylite Corp.
Los Angeles, Calif. Electrofilm Corporation
Dayton, Ohio Hohman Plating
Newark, N. J. Pyrene Manufacturing Company
Ravenna, Ohio Allen Aircraft Products, Inc.
St. Louis, Missouri Mid-West Rust Proof Co., Inc.
Seattle, Wash. Precision Engineering, Inc.
Tulsa, Okla. A & B Commercial Finishing Co.

Electrofilm CORP.

DEPT. LNA, 7116 LAUREL CANYON BLVD., NO. HOLLYWOOD, CAL.



Donaldson Air Cleaners are EASY TO SERVICE!

The simplicity and speed of servicing Donaldson Air Cleaners encourages regular attention by the machine operator. No tools are needed to remove oil cup. Cleaning cup and re-filling with oil is a two-minute job. Removable tray makes cleaning out chaff, lint, leaves and larger foreign particles simple and fast.

CUSTOM-BUILT TO FIT YOUR ENGINE

Write our engineering department for air cleaner recomendations.

DONALDSON CO. INC.
666 Pelham Blvd., St. Paul 4, Minn.
Grinnell Division: Grinnell, Iowa
Donaldson Company (Canada) Ltd., Chatham, Ontario

Donaldson *Air Cleaners Mufflers*

DE-STA-CO Toggle Clamps speed production on this simple, efficient wood turntable fixture for volume cementing of plastic fish-net floats. Twenty-four Model 210-U clamps are used to obtain quick clamping pressure. The rugged construction of De-Sta-Co clamps has permitted continuous use for over 2½ years producing 240 to 300 floats per hour. Completely retractable, they permit easy insertion and removal of work. De-Sta-Co's positive clamping pressure on the float parts makes a perfect bond and accurate assembly.

Select from over 40 models of De-Sta-Co Toggle Clamps for your work-holding problems in assembly, welding, bonding, machining or inspection of any materials. Positive holding pressures up to 4000 pounds.

Write today for your copy of the De-Sta-Co Toggle Clamp Catalog describing more than 45 stationary and portable types.

DESTACO **DETROIT STAMPING COMPANY**
420 Midland Ave. • Detroit 3, Mich.

AVIATION Service ENGINEER

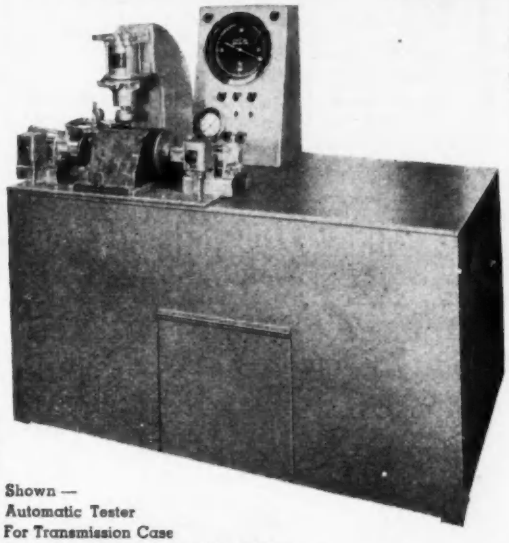
Leading manufacturer of aviation finishing metal cleaning materials has an opening for a plant chemist process engineer or maintenance supervisor for technical service to the aviation industry.

This position will entail considerable travelling through the United States doing field work with local representatives assisting them with their sales and product application in the aircraft industries.

Applicants must be 30 to 40 years of age, know mechanical and chemical processes and equipment and have experience in aircraft or airlines maintenance engineering. Headquarters will be in New York.

Reply giving full details of education, experience and personal status to Box A.I.M. #2, F. B. Johnston, 117 Liberty St., New York 6, N. Y.

VACUUM TESTING MACHINE



Shown —
Automatic Tester
For Transmission Case
Red Light—Reject Green Light—Pass

INDICATES LEAKS IN WALLS OR SEAMS OF:

- CASTINGS
- OIL PANS
- FUEL TANKS
- OIL SEALS, ETC.

NEW
REVOLUTIONARY
NO SUBMERSION
CLEAN • • • FAST

WRITE FOR FREE CATALOG

WHITTINGTON

WHITTINGTON PUMP & ENGINEERING CORP.
1126 Prospect Street • Indianapolis 3, Indiana

NEW

BURDETT "IN-A-DUCT" AIR HEATER

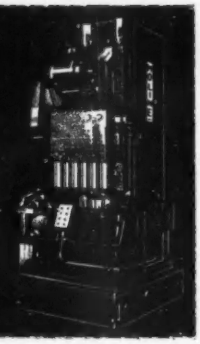
—adaptable to wide range of industrial drying and heat processing operations. Ideal as "old oven" booster Unit.

Very compact and exceptionally efficient, the "In-A-Duct" Heater will operate in duct systems having a static pressure up to 4". It is available in six sizes ranging in capacity from 100,000 BTU/Hr. to 4,200,000 BTU/Hr. The famous Burdett "Radiant Heat" Burners are employed, featuring the most complete combustion known in industrial systems and, therefore, the greatest operating economy possible. The "In-A-Duct" Heater is a package-unit integrally incorporating all operating parts, including electric ignition and flame failure protection. Controls and relays are mounted on a separate panel board—panel board can also be supplied. Extremely simple to service—burner assembly slides out of side of Unit. No obligation for recommended applications. Write for complete data.

BURDETT
MANUFACTURING COMPANY
3427 West Madison Street Chicago 24, Illinois

Also Manufacturers of "Radiant Heat" Systems, Ovens, Heaters, Air Make-Up Units, Spray Booths and Washers.

FOR OVER 50 YEARS
MOLINE "Hole-Hog"
SPECIALLY DESIGNED
MACHINE TOOLS
HAVE CUT PRODUCTION COSTS
FOR AMERICAN INDUSTRY



MOLINE TOOL CO.
MOLINE, ILLINOIS

DRILLING
BORING
HONING
TAPPING and
Special Machines

MOLDED RUBBER PRODUCTS

YOUR problem is our problem when molded rubber products are involved. Take advantage of Lorraine's modern facilities and experience which has served the automotive, aviation and allied industries for many years.

SPECIALISTS IN —

MOLDED RUBBER PARTS • HYDRAULIC BRAKE PARTS
BONDING RUBBER TO METAL • SHOCK MOUNTS
"O" RINGS AND HYDRAULIC PACKINGS

Skilled in ASM and ASTM Specifications and Silastic Material

Write today for further information.

LORRAINE MANUFACTURING CORP.
(Dept. A) 50 West Hunter Avenue · Maywood, New Jersey

JUTE AND COTTON FELT
for
INSULATION—
COMBINATION SEATS
Your Quality Manufacturer
Since 1878
the CHAS. A. MAISH CO.
FRANKLIN, OHIO

PIPE and AUTOMOTIVE PLUGS
and FITTINGS
Ferrous & Non-Ferrous
PITTSBURGH PLUG
AND PRODUCTS CO.
Pittsburgh 15, Pa. · · · Evans City, Pa.

FELLOWS
Fellows
MACHINES AND TOOLS FOR
GEAR PRODUCTION
The Fellows Gear Shaper Company, Springfield, Vt.

SPRINGS
Measurably Better
Service Springs
FOR ALL CARS AND TRUCKS
SERVICE SPRING COMPANY · INDIANAPOLIS 6 INDIANA

Herbrand SINCE 1881
PRECISION
DROP FORGINGS
...any size or shape up to 200 lbs.
Herbrand DIVISION
THE BINGHAM-HERBRAND CORPORATION, FREMONT, OHIO

STEEL RULE
Dies
SINCE 1900
RICHARDS
KALAMAZOO 60F, MICH.
HEADQUARTERS FOR
DIE MAKING OUTFITS
For cutting Panels, Mats, Gaskets
EVERYTHING FOR AUTOS—PLANES

WILLIAMS
DROP-FORGINGS
• ANY SHAPE • ANY MATERIAL
• COMPLETE FACILITIES
→ Write for Informative Forging Data Folder
J. H. WILLIAMS & CO. 460 VULCAN STREET Buffalo 7, New York

TRACK SUPPLIES STRUCTURAL STEEL RAILS
RAILS New and Relaying!
TRACK MATERIALS
AND ACCESSORIES CARRIED IN STOCK
Switch Material • Spikes and Bolts • Track Tools • Ties • Tie Plates • Bumpers • Complete Side Tracks
BUILDERS STEEL SUPPLY CO.
4201 WYOMING • P.O. BOX 188 • DEARBORN, MICH.
SEND US YOUR INQUIRIES

Classified Advertisement

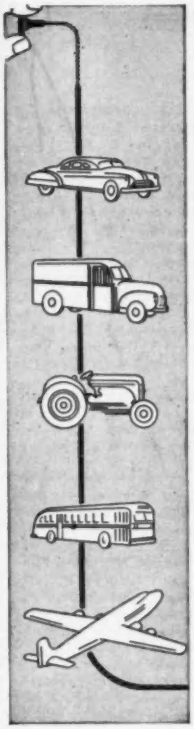
ATTENTION MECHANICAL RUBBER PARTS MANUFACTURERS. EXCELLENT OPPORTUNITY FOR RUBBER MANUFACTURER TO OBTAIN SALES AND ENGINEERING REPRESENTATION IN THE AUTOMOTIVE, AIRCRAFT, MARINE AND ALLIED INDUSTRIES.
WE ARE ESTABLISHED AND HAVE OVER TWENTY YEARS' EXPERIENCE AND ARE EQUIPPED TO HANDLE ENGINEERING, DESIGN, DEVELOPMENT AND ANALYTICAL SERVICE ALONG WITH UNEXCELLED SALES ABILITY. H. A. KING CO., WEST FORT STREET AT 10TH, DETROIT 16, MICH.

Quantity
PRODUCTION
of
GREY IRON CASTINGS

ONE OF THE NATION'S
LARGEST AND MOST MODERN
PRODUCTION FOUNDRIES

ESTABLISHED 1866
THE WHELAND COMPANY
FOUNDRY DIVISION

MAIN OFFICE AND MANUFACTURING PLANTS
CHATTANOOGA 2, TENNESSEE



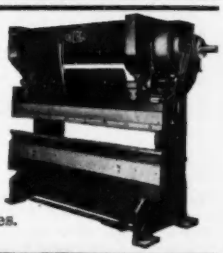
TELEFLEX
CONTROLS
give you these
4
ADVANTAGES

1 **MINIMUM OF LOST MOTION**—close tolerances held between Teleflex Cable and Conduit reduce snaking.
2 **UNLIMITED ROTARY MOTION** — Teleflex screw-type flexible Cable meshes with specially hobbed gears in Teleflex Boxes. Permits unlimited rotary motion.
3 **VERSATILITY OF INSTALLATION** — Teleflex Cable and Conduit can be routed around obstructions and through tight places.
4 **EASE OF INSTALLATION** — Teleflex mechanical remote control systems assembled at point of installation from standard Teleflex parts.

Let our Engineering Department help you with your control problems. Write for Catalog 300A.

TELEFLEX
INCORPORATED
248 W. Wingohocking Street
Philadelphia 40, Pa.
MECHANICAL REMOTE CONTROLS

CHICAGO
STEEL
PRESS BRAKES
43 Standard Sizes
DIES Punching and Forming for All Makes and Sizes of Press Brakes.



DREIS & KRUMP
MANUFACTURING COMPANY
CHICAGO
7420 S. Loomis Blvd., Chicago 36, Illinois

Positions Available for
EXPERIENCED ENGINEERING PERSONNEL

POSITIONS AVAILABLE FOR *EXPERIENCED* ENGINEERING PERSONNEL FOR THE DEVELOPMENT OF GAS TURBINES AND GAS TURBINE COMPONENTS SPECIALIZING IN THE FIELDS OF—

THERMODYNAMICS
AERODYNAMICS
COMBUSTION
DESIGN AND DRAFTING

GIVE COMPLETE DATA ON EDUCATION, EXPERIENCE, MINIMUM SALARY REQUIREMENTS, ETC., IN FIRST LETTER TO PERSONNEL OFFICE, LYCOMING-SPENCER DIVISION, AVCO MANUFACTURING CORPORATION, 652 OLIVER STREET, WILLIAMSPORT, PENNA. ALL INQUIRIES HELD *STRICTLY CONFIDENTIAL.*

Over 85% of the torque wrenches used in industry are
Sturtevant
TORQUE WRENCHES
Read by Sight, Sound or Feel
- Permanently Accurate
- Practically Indestructible
- Faster—Easier to use
- Automatic Release
- All Capacities

in inch ounces
...inch pounds
...foot pounds
(All sizes from 0-6000 ft. lbs.)

Every manufacturer, design and production man should have this valuable data. Sent upon request.

P.A. STURTEVANT CO.
ADDISON QUALITY ILLINOIS

Index to

The Advertisers' Index is published as a convenience, care will be taken to index correctly. No allowance

A

AC Spark Plug Div. ... —
Acadia Div. Western Felt Works ... 10
Accurate Bushing Co.... —
Ace Drill Bushing Co., Inc. ... —
Ace Plastic Co. ... 156
Acushnet Process Company ... —
Aeroquip Corporation .. —
Aetna Ball & Roller Bearing Co. ... 109
Air-O-Matic Power Steer Corp. ... —
Ajax Manufacturing Co., The ... —
Allegheny-Ludlum Steel Corp. ... —
Allen Mfg. Co. ... —
Allied Products Corp. .. —
Allison Engine Co. ... —
Allmetal Screw Products Co., Inc. ... —
Alumicast Corp. ... 153
Aluminum Co. of Amer., 149-160
Aluminum Industries, Inc. ... —
American Bosch Corp. .. —
American Brakeblok Div. 189
American Broach & Machine Co. ... 195
American Chain & Cable Co. ... —
American Chemical Paint Co. ... 105
American Hard Rubber Co. ... —
American Pullmax Co., Inc. ... —
American Steel & Wire Div. ... 112-113
American Steel Foundries —
Armstrong Cork Co., 82-128-129
Artos Engineering Co.... —
Associated Spring Corp.. 28
Automatic Spring Coiling Co. ... —
Automotive Gear Works, Inc. ... —
Avco Mfg. Corp. ... 201

B

Babcock & Wilcox Co., Tubular Products Div. —
Baird Machine Co., The —
Baldwin-Lima-Hamilton Corp. ... —
Barber-Colman Co. .... —
Barnes Co., Wallace 28
Barnes, W. F., & John.. —
Barnes-Gibson-Raymond 28
Bath Company, Cyril .. 116
Bearings Co. of Amer... —
Bendix Aviation Corporation
Bendix Products Div.. 14
Eclipse Machine Div... —
Radio Div. ... 79
Scintilla Magneto Div.. —
Stromberg-Elmira Div. 117
Zenith Carburetor Div. —
Bendix-Westinghouse Automotive Air Brake Co. ... —
Bethlehem Steel Co. ... —
Binks Mfg. Co. ... 88
Black & Decker Mfg. Co. 26
Blakeslee & Co., G. S. .. —
Bliss Co., E. W. ... 163
Blood Bros. Machine Co. —
Bodine Corporation, The —
Borg & Beck Div. ... 90
Borg-Warner Corp. ... —
Brainard Steel Div. ... 178
Brandt, Inc., Chas. T. ... —
Brown Corp., The ... 106
Brush Development Co. . 158
Buckeye Tools Corp. ... —
Buhr Machine Tool Co.. —
Builders Steel Supply Co. 200
Bullard Company, The.. —
Bulldog Electric Products Co. ... —
Bundy Tubing Company, 144-145
Burdett Mfg. Co. ... 199
Burg Tool Mfg. Co. ... —

C

C.A.V. Division of Lucas Electrical Services, Inc. —
Camcar Screw & Mfg. Corp. ... 102
Campbell, Wyant & Cannon Foundry Co. ... 131
Cannon Electric Co. ... 140
Carboloy Dept. of General Electric Co. ... —
Cardox Corp., The ... —
Central Screw Co. ... —
Chambersburg Engineering Co. ... —
Chicago Rawhide Mfg. Co. ... 96
Chicago Rivet & Machine Co. ... 132
Chicago Screw Co., The 108
Chiksan Co. ... 184
Cincinnati Cleaning & Finishing Machinery Co. ... 92
Cincinnati Milling Machine Co. ... —
Clark Bros. Co., Inc. .... —
Clark Equipment Co.... 98
Classified Advertisement 200
Clearing Machine Corp.. 75
Cleveland Container Co.. 142
Cleveland Metal Abrasive Co. ... 159
Cleveland Punch & Shear Wks. Co., The ... —
Climax Molybdenum Co. —
Clinton Machine Co. Metalmaster Div. ... 148
Colonial Broach Co.... —
Columbia-Geneva Steel Co. ... 112-113-150-151-188
Cone Automatic Machine Co., Inc. ... 12
Connecticut Hard Rubber Co. ... —
Continental-Diamond Fibre Co. ... 107
Continental Motors Corp. —
Continental Screw Co... 126
Continental Tool Works Div. ... —
Coolidge Corp. ... —
Cotta Transmission Co.. —
Crescent Co., Inc. ... 170
Cross Company, The ... —

D

Danly Machine Specialties, Inc. ... —
Davis & Thompson Co... —
Delco Products Div. G.M. ... —
Detroit Aluminum & Brass Corp. ... —
Detroit Stamping Co. ... 198
Do-All Co., The ... —
Dole Valve Co., The ... 110
Donaldson Co., Inc.... 198
Dow Chemical Co. ... —
Dow Corning Corp. 63
Dreis & Krump Mfg. Co. 201
Dunbar Brothers Co. ... 28
Dumore Company ... 146
du Pont de Nemours & Co., Inc., E. I. ... 171
Dykem Co., The ... —
Dynamatic Corp. Div. Eaton Mfg. Co. ... —

E

Eaton Manufacturing Co. ... 13-77-123
Eberhard Mfg. Co.... —
Elastic Stop Nut Corp... 27
Elco Tool & Screw Corp. —
Electric Auto-Lite Co., The ... —
Electric Furnace Co., The 152
Electric Products Co. ... —
Electric Storage Battery Co. ... —
Electroflim Corp. ... 198
Elmes Engineering Div.. —
Elox Corp. of Michigan. —
Equipment Sales Div.. 134-135
Evans Products Co. 125
Ex-Cell-O Corp. ... —

F

Facs Products, Inc. ... —
Fairfield Mfg. Co. ... 120
Fasco Industries, Inc. ... —
Federal-Mogul Corp. 177
Federal Products Corp. . 187
Fellows Gear Shaper Co., The ... 200
Firestone Steel Products Co. ... —
Fitzgerald Mfg. Co., The —
Foote-Burt Company, The ... 30
Fort Pitt Malleable Iron Div. ... —
Fram Corp. ... —
Frenchtown Porcelain Co. ... —
Frontier Bronze Corp.... —
Fuller Manufacturing Co. 91

G

G & O Mfg. Co., The.... —
Galland-Henning Mfg. Co. ... 114
Garrett Co., Inc., Geo. K. —
General Electric Company ... —
Gibson Co., Wm. D..... 28
Gisholt Machine Co..... 180
Gits Bros. Mfg. Co..... —
Globe-Union, Inc. ... —
Goodrich Chemical Co., B. F. ... —
Great Lakes Steel Corp. 81
Greenlee Bros. & Co.... —
Greer Stop Nut Co. 148
Gries Reproducer Corp.. 156
Gunite Foundries Corp.. —

H

H & P Die & Stamping Co. ... —
Handy & Harman ..... —
Hannifin Corp. 11
Hartford Special Machinery Co. ... 172
Hartford Steel Ball Co., The ... —
Heald Machine Co. 2nd Cover
Herbrand Division, The Bingham-Herbrand Corp. ... 200
Hevi Duty Electric Co... —
Hill Acme Company, The —
Holcroft & Co. ... —
Holley Carburetor Co.... —
Hoover Ball & Bearing Co. ... 138
Hotel Cleveland 154
Howell Electric Motors Co. ... —
Hyatt Bearings Div..... 7
Hydraulic Press Mfg. Co. —
Hy-Pro Tool Co. ... —

I

Illinois Tool Works 111
Imperial Brass Mfg. Co.. 161
Indiana Gear Works .... —
Industrial Filter & Pump Mfg. Co. ... —
Industrial Filtration Co. 147
Inland Manufacturing Div. ... —
Inland Steel Company .. 59
International Nickel Co., Inc. ... 2

J

J F D Mfg. Co.... —
Janitrol Div. Surface Combustion Corp. .... —
Johnson Bronze Co..... 86
Johnson Products, Inc... 97
Johnston, Frank B..... 198
Jones Motrola Corp. .... —
Justrite Mfg. Co..... —

K

Kelsey-Hayes Wheel Co. 155
Kennedy Car Liner & Bag Co., Inc. ... —
Kent-Owens Machine Co. —
King-Seeley Corporation —
Kingsbury Machine Tool Corp. ... —
Kold-Hold Mfg. Co..... 122
Korfund Co., Inc..... —
Kropp Forge Ordnance Company ... 162

Advertisers

and not as part of the advertising contract. Every will be made for errors or failure to insert.

L

Lake Erie Engineering Corp. 94-95
Lamb Electric Company. 87
La Pointe Machine Tool Co. 165
Layne & Bowler, Inc.... —
Leece-Neville Co., The.. —
Leeds & Northrup Co... 186
Leland, Inc., G. H..... —
Le Roi Company..... —
Link-Belt Co..... —
Lipe-Rollway Corp. 169
Littelfuse, Inc. ..... —
Littell Machine Co., F. J. —
Logan Engineering Co... —
Long Manufacturing Div. 83
Lord Manufacturing Co. —
Lorraine Mfg. Corp..... 200
Lucas Machine Div. New Britain Machine Co. .. —
Lycoming-Spencer Div. Avco Mfg. Corp..... 201

M

McKay Machine Co., The —
Magnaflux Corp. ..... —
Mahon Co., The R. C.... —
Maish Co., Chas. A..... 200
Mall Tool Company .... —
Mallory & Co., Inc., P. R. 141
Markem Machine Co. .. 196
Marman Products Co., Inc. 78
Mattison Machine Works —
Mechanics Universal Joint Div. 175
Melling Tool Co..... —
Metalmaster Div. of Clinton Machine Co.... 148
Michigan Steel Tube Products Co. ..... —
Michigan Tool Co..... —
Micromatic Hone Corp... —
Midland Steel Products Co. ..... —
Milsco Manufacturing Co. —
Milwaukee Div. 28
Minnesota Mining & Mfg. Co. ..... —
Moline Tool Co. 200
Moraine Products Div.... 168
Morris Machine Tool Co. 192
Morse Chain Co. ..... —
Motch & Merryweather Machinery Co. ..... —
Muskegon Piston Ring Co. 127

N

N-A-X Alloy Division... 81
Nash Bros. Company .... —
National Acme Co., The —
National Broach & Machine Co. ..... —
National Carbon Co..... 139
National Machinery Co.. —
National Metal Edge Box Co. ..... —
National Motor Bearing Co. 167
National Screw & Mfg. Co. ..... —
National Steel Corporation 81
National Tube Division.. 188
New Britain Machine Co. —
New Departure Div. Back Cover
Niagara Machine & Tool Wks. 100-101
Norton Company ..... —

O

O & S Bearing Co..... —
Oakite Products, Inc.... —
Ohio Crankshaft Co..... 182
Ohio Division 28
Ohio Seamless Tube Co., The 133
Osborn Manufacturing Co. 193

P

Page Steel & Wire Div., Amer. Chain & Cable Co., Inc. ..... —
Palnut Company, The... —
Pangborn Corp. 4
Parker Appliance Co.... —
Parker Rust Proof Co... 164
Perfect Circle Corp..... —
Perfection Stove Co..... —
Perma Products Co..... —
Pesco Products Div. Borg-Warner Corp. ... 174
Peters-Dalton, Inc. 157
Pheoll Manufacturing Co. 154
Phillips Manufacturing Company ..... —
Pierce Governor Co., Inc. —
Pines Engineering Co., Inc. ..... —
Pittsburgh Plug & Products Co. 200
Pittsburgh Steel Co. (Thomas Strip Div.).. —
Plastic Research Products ..... —
Polyken Industrial Tapes Dept. of Bauer & Black 5
Potter & Johnston Co... —
Pratt & Whitney Div., Niles-Bement-Pond Company ..... —
Purolator Products, Inc.. —

R

Ramsey Corporation ... —
Rathborne, Hair & Ridgway Box Co. ..... —
Raybestos-Manhattan, Inc. 134-135
Raymond Mfg. Co. 28
Remont Mfg. Co. ..... —
Republic Steel Corp. (Steel & Tubes Div.).. —
Revere Copper & Brass, Inc. 181
Reynolds Metals Co..... —
Reynolds Wire Div..... —
Richards Co., J. A. 200
Rinshed-Mason Company 179
Rockford Clutch Div.... 124
Rockford Machine Tool Co. ..... —
Ross Gear & Tool Co.... 9
Roto-Finish Co..... —
Russell, Burdsall & Ward Bolt & Nut Co..... 173
Ryerson & Son, Inc., Joseph T. 16

S

SKF Industries, Inc..... 121
Saginaw Steering Gear Div. ..... —
Schmieg Industries, Inc.. —
Schrader's Son, A..... 183
Schwitzer-Cummins Co.. —
Sealed Power Corporation 69
Seamless Rubber Co..... —
Seneca Falls Machine Co. —
Service Spring Co..... 200
Shakeproof, Inc. 111
Sheffield Corp. ..... —
Shuler Axle Co., Inc. .. —
Simmons Fastener Corp. 89
Simonds Abrasive Co. ... —
Sperry Products, Inc..... —
Spicer Mfg. Div. Dana Corp. 103-104
Stalwart Rubber Co., The —
Standard Locknut & Lockwasher, Inc. ..... —
Standard Oil Co. (Ind.) —
Standard Pressed Steel Co. 166
Standard Tube Company —
Steel Products Engineering Co. ..... —
Sterling Aluminum Products, Inc. ..... —
Stewart-Warner Corp. .. 137
Strom Steel Ball Co..... —
Sturtevant Co., P. A.... 201
Subscription Post-Card.. 20
Sun Electric Corp..... 143
Sun Oil Company 6
Sundstrand Machine Tool Co. ..... —
Superior Steel Corp. ... 185
Surface Combustion Corp. ..... —
Synchro-Start Products, Inc. 73

T

Taylor Dynamometer & Machine Co. 196
Teleflex, Inc. 201
Tennessee Coal, Iron & R. R. Co. ...112-113-150-151
Texas Company, The... —
Thompson-Bremer & Co. 3rd Cover
Thompson Products, Inc. 29-71
Timken Detroit Axle Co. (Brake Div.) ..... —
Timken Roller Bearing Co., The 24
Tinnerman Products, Inc. 197
Tomkins-Johnson Company, The ..... —
Torrington Co., The..... 61
Tourek Mfg. Co., J. J... 3
Towmotor Corporation .. 176
Tung-Sol Electric, Inc... 76
Tuthill Pump Co..... 80
Tuthill Spring Co. ..... —
TwinDisc Clutch Co..... —

U

Union Bag & Paper Corp. —
United Engine & Machine Co. ..... —
United Specialties Company 8
United States Rubber Co. 191
United States Steel Corp. ..112-113-150-151-188
United States Steel Wire Spring Co. 194
Universal Products Co., Inc. ..... —

V

Vanadium Corp. of Amer. 99
Vellumoid Co., The..... —
Verson Allsteel Press Co. —
Vickers, Inc. 93
Victor Manufacturing & Gasket Co. 31
Vulcan Rubber Products, Inc. ..... —

W

Wagner Electric Corp. .. —
Waldes-Kohinoor, Inc.... —
Warner Electric Brake & Clutch Co. ..... —
Waterbury Tool Div. Vickers, Inc. ..... —
Waukesha Motor Company 1
Wean Equipment Corp. 84-85
Webb Co., Jervis B..... 136
Wellman Bronze & Aluminum Co., The..... 130
Western Felt Works 10
Westinghouse Electric Corp. 118-119
Wheland Company, The. 201
Whittington Pump & Engrg. Corp. 199
Williams & Co., J. H.... 200
Wiry Joe 170
Wisconsin Motor Corp... 152
Wittek Mfg. Co. ..... —
Wrought Washer Mfg. Co. ..... —
Wyman-Gordon 190

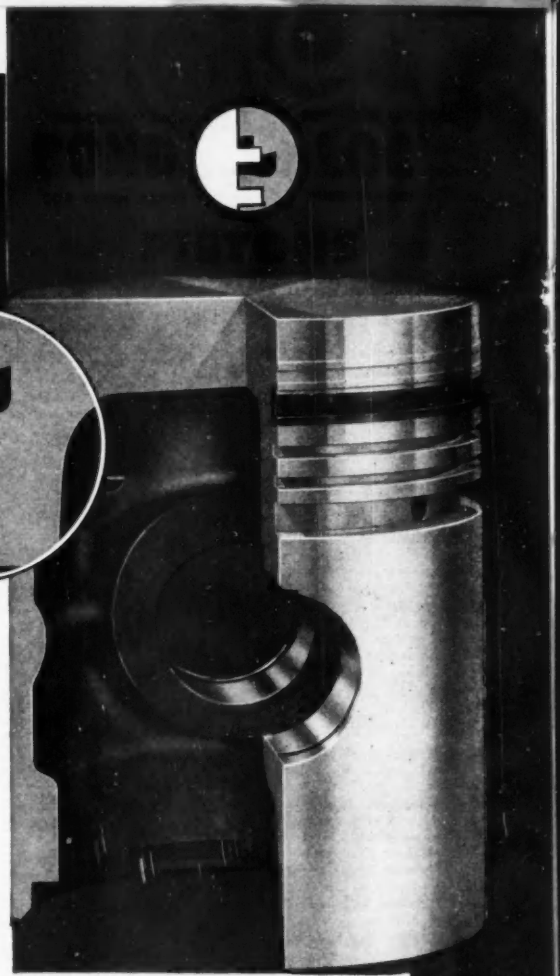
Y

Yale & Towne Mfg. Co., The 67
Yates-American Machine Co. ..... —
Young Radiator Company ..... —
Young Spring & Wire Corp., L. A. 115

Z

Zollner Machine Works.. 204

ANOTHER *new* DEVELOPMENT by ZOLLNER

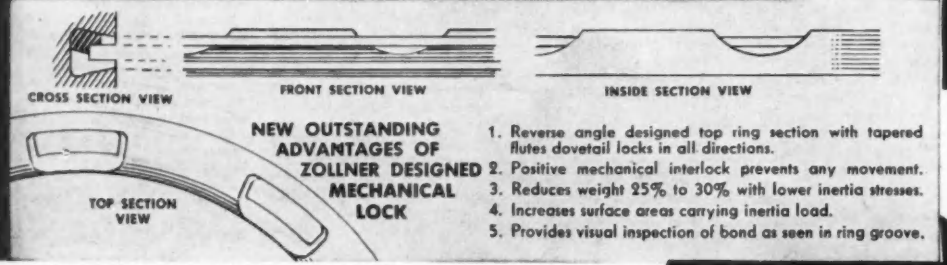


Double Bonded

METALLURGICALLY Al-fin Bond

MECHANICALLY Zollner Lock

Now, another great advancement in piston design is made available to engine builders by Zollner engineers. It's the new BONDOLOC Piston for heavy duty engines where excessive top ring groove wear has been a problem. A "Ni-resist" iron groove section is *permanently* incorporated in this piston by *both* Al-fin metallurgical and Zollner mechanical bond — *double bonded and locked* to positively prevent separation failure in any service. The exclusive Zollner mechanical lock with reverse angles on every surface joining "Ni-resist" iron and aluminum provides a multiple dovetail bond which is infinitely wedge-locked. Zollner engineers invite immediate discussion of the many advantages of BONDOLOC Pistons by application to your engine.



NEW OUTSTANDING ADVANTAGES OF ZOLLNER DESIGNED MECHANICAL LOCK

1. Reverse angle designed top ring section with tapered flutes dovetail locks in all directions.
2. Positive mechanical interlock prevents any movement.
3. Reduces weight 25% to 30% with lower inertia stresses.
4. Increases surface areas carrying inertia load.
5. Provides visual inspection of bond as seen in ring groove.

Licensed under Patents 2,396,730; 2,455,457; 2,550,879. *T.M

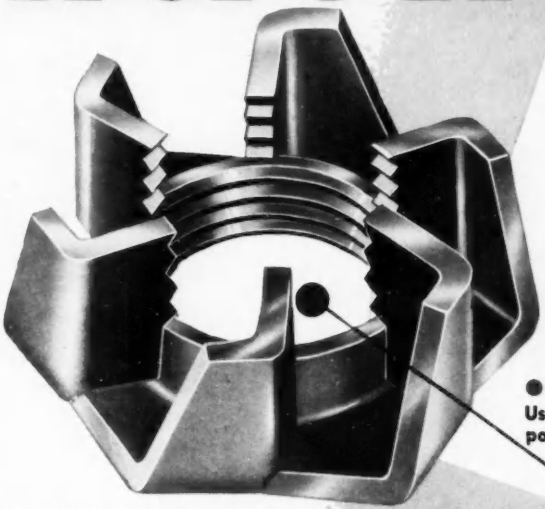
ZOLLNER

The Original Equipment **PISTONS**

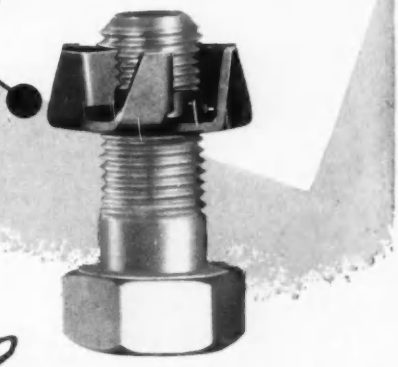
ZOLLNER MACHINE WORKS • FORT WAYNE, IND.

here it is...

The LOCKNUT with All the Features You Want!



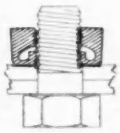
- **ALL METAL**
  Unyielding, unaffected by water, oil or heat up to 550°.
- **SPINS DOWN**
  Shrinks as it sets. Finger-free until locked.
- **ONE PIECE**
  A single item to order. A single item to stock. A single item to handle.
- **LIGHT WEIGHT**
  Approximately 1/3 as heavy as same size common hex nut.
- **HEX SHAPE**
  Uses common six-sided socket or box wrench or power tool.



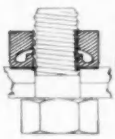
Speedy in handling and application, the EverLOCK Nut design also permits faster spin-down than the friction-type locknut, as proved by time-and-motion studies. This is because the vise-like grip is applied only *after* the nut contacts the work.

HOW IT WORKS

The base of the EverLOCK Nut is concave with the tines relaxed while nut is spun down to the work. Tightening of the nut flattens its base against the work, forcing the tines inward against the threads of the bolt.



When locked in position, the nut is tight and flat against the work and the threaded tines are locked securely against the bolt.



EverLOCK Nut

AMF

Pioneered, Patented, Developed by the Manufacturers of EverLOCK Washers

DON'T DELAY—Write us or ask our nearest representative about the EverLOCK Nut today...find out how this short-cut to vibration-proof fastenings can make your operation more profitable.

THOMPSON-BREMER & CO.
Subsidiary of American Machine and Foundry Co., New York
1642 W. Hubbard Street, Chicago 22, Illinois

WRITE FOR INFORMATION OR CONTACT YOUR NEAREST DISTRIBUTOR

GREATER NEW YORK
J. Ramsey Reese, Inc.
71 Murray Street
New York, New York

NEW ENGLAND STATES
J. M. Murphy
One Starr Street
Mystic, Connecticut

PENNSYLVANIA
Russell T. Brosius
1617 Pennsylvania Blvd.
Philadelphia 3, Pa.

OHIO
Kenneth D. DeLaney
1942 Speice Avenue
Dayton, Ohio

John Goory
1484 Blossom Park Ave.
Lakewood 7, Ohio

INDIANA
Donald G. Teeling
6325 N. Guilford Ave.
Indianapolis 20, Indiana

MICHIGAN
Sam T. Keller
2457 Woodward Avenue
Detroit, Michigan

WISCONSIN
W. L. Barth, Jr.
9 South Clinton Street
Chicago, Illinois

TEXAS
C. W. McNeil
704 M & M Bldg.
Houston, Texas

MINNESOTA
Leonard F. Berg
2639 University Avenue
St. Paul 4, Minnesota

IOWA
Thom Lundeen
505 Cleaveland Bldg.
Rock Island, Illinois

ST. LOUIS
David A. Smith
4030 Chouteau Avenue
St. Louis, Missouri

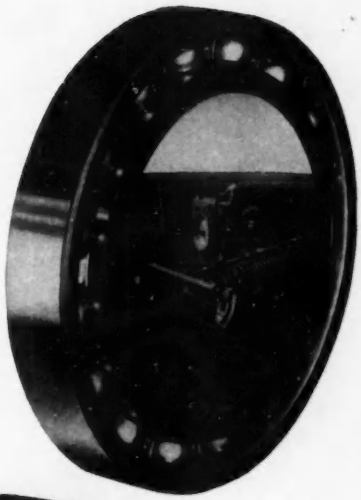
WESTERN NEW YORK
A. J. Murphy
4457 E. Genesee St.
DeWitt, New York

WEST COAST
Richard C. Dudek
1729 Wilshire Blvd.
Santa Monica, Calif.

CANADA
P. L. Robertson
Mfg., Co., Ltd.
Milton, Ontario

No conversion problem ...

in these dual-purpose plants

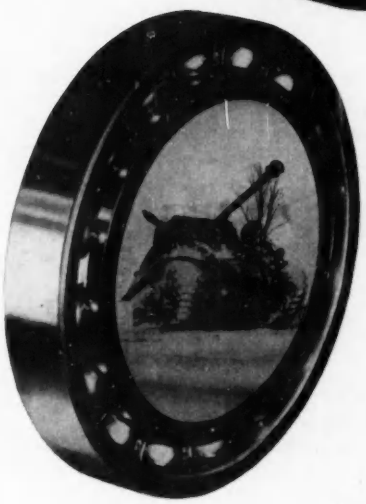


Jig borers and jets, trucks and tanks, household appliances and electronic instruments, all use New Departure ball bearings of the same materials, same heat treatment, the same methods of precision manufacture.

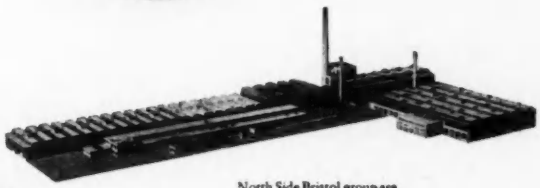
Thus conversion from one to the other in New Departure's three great plants is largely a matter of changing the emphasis on types and sizes.

The capacity of the world's largest ball bearing plants is your assurance of the best possible production schedules.

New Departure's engineers and vast resources for research are freely at your disposal.



Nothing Rolls Like a Ball...



North Side Bristol group are "guns-and-butter" plants.

NEW DEPARTURE

BALL BEARINGS

NEW DEPARTURE • DIVISION OF GENERAL MOTORS CORPORATION • BRISTOL, CONNECTICUT